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ABSTRACT

This report is based on the results of the National Drug/Alcohol Collaborative Project which examined the prevalence of multiple substance use, particularly the combined use of drug and alcohol. The introductory chapter describes the background and purpose of the project. Chapter Two reviews the literature about multiple substance abuse and discusses conceptual and historical definitions of multiple substance-taking behavior, medical hazards, and drug use patterns of alcoholics as well as alcohol use patterns of drug addicts. Chapter Three presents findings of substance use patterns identified by the 10 project programs, as well as users' consequences, demographic and psychosocial characteristics of the sample, and descriptions of the participating programs. Chapter Four discusses the findings of an experimental study to examine the efficacy of treating drug and/or alcohol abusers separately and together. The final chapter presents the methodology and findings of an additional study that examined the nature and extent of alcohol use and treatment outcomes in a drug-abusing sample. (Author/NRB)

National Drug/Alcohol Collaborative Project: Issues in Multiple Substance Abuse

Edited by

STEPHEN E. GARDNER D.S.W.

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Contents

Summary

The National Drug/Alcohol Collaborative Project (NDACP) was jointly sponsored by the National Institutes on Drug Abuse (NIDA) and Alcohol Abuse and Alcoholism (NIAAA) from 1974 through 1978. The initiative stemmed largely from increased reports of multiple substance use, especially involving the combined use of drugs and alcohol.

Joint guidelines for research and demonstration grants were developed by the two Institutes to encourage projects which could provide and evaluate treatment and rehabilitation programs for population groups experiencing mixed substance abuse, i.e., alcohol and other drug abuse and/or addiction. Ten programs ultimately became part of this project. The overall objectives were as follows:

(1) To provide a conceptual and historical literature review that would describe multiple substance use;

(2) To determine the kinds of substance abusers who could be drawn into demonstration programs designed specifically to serve mixed (drug/alcohol) substance abusers;

(3) To collect information from clients in these programs regarding lifetime and recent substance use histories and consequences of different substance combinations; and

(4) To carry out and evaluate combined treatment techniques—i.e., to determine the efficacy of treating single substance abusers (alcohol or drug) and/or multiple substance abusers (alcohol and drug) within a single facility and/or modality.

Eagleville Hospital and Rehabilitation Center (EHRC), Eagleville, Pa., was chosen to help develop a uniform instrument to collect the data, manage the central data systems, and provide training of interviewers at the local program level. Eagleville had been a proponent of the combined (drug and alcohol) treatment approach and was in the process of conducting a research project in this specialized area. The instrument used at the 10 program sites consisted of 330 items, including questions concerning lifetime and recent use of 14 substances, as well as questions regarding demographic and life history issues. A reliability test was performed with the substance categories using 96 clients who were asked to respond to questions on substance use at intake and again 7 to 12 days later. Percent of concurrence of responses to

use of different substances varied from 77 percent (minor tran quilizers) to 98 percent (alcohol) with a median of 89 percent fo the 14 substance categories.

The participating programs and number of clients included are shown in table 1.

Analysis was made of the 1,544 clients regarding substance use patterns, and demographic and other variables. Findings includ the following:

(1) Alcohol abuse accounted for virtually all of those classifie as single substance abusers (95 percent) throughout thei substance abuse careers. Those who abused only alcohol were older (40 years) than those who had been multiple substance abusers (x=26 years). Those who were exclusiv users of marijuana/hashish were the most youthful (49 percent were 17 years old or younger). Those using hero fell in between these two groups (55 percent were 29 year old or younger).

(2) Except in the inhalant abuse category, the majority of sub jects using multiple substances reported using one or mor other substances to "boost, balance, counteract, or sustain the effects of substances already taken. More than 75 percent of the regular users of barbiturates, marijuana, cocaine, and antidepressants reported using other drugs t alter the effects of these substances. The two drugs mos commonly used to alter the effects of other substances wer alcohol and marijuana.

(3) The two substance categories within which substitution of other substances occurred most frequently were heroin an illegal methadone; the two categories in which substitution occurred least frequently were alcohol and inhalants. Alcoh and marijuana were reported most frequently as substitute for other drugs.

(4) Problems associated with use of alcohol were found to be significantly related to age, sex, use of alcohol as the onl drug of abuse, and amount of alcohol used.

(5) Problems associated with use of substances other than alcoh were found to be significantly related to race, age, and ty and number of substances used.

Findings from the Eagleville Residential Combined Treatment Program are presented in chapter 4. Using random assignments this project examined the relative effectiveness of treating alco holics and heroin addicts separately as opposed to those popula tions in a combined setting. The total sample drawn (N=688) consisted of more subjects who were primarily alcoholics (56 percent) than subjects who were primarily herion addicts (44 percent). Data collected included measures of inprogram perfor ance (group therapy performance, ratings by staff as well as

TABLE 1.—Distribution of NDACP clients according to program

Program	Number of clients
Addiction Research and Treatment Corp., Brooklyn, N.Y.	140
Areawide Drug/Alcohol Research Project, Denver, Colo.	83
Drug Problems Resource Center of the North Charles Foundation, Cambridge, Mass.	102
Eagleville Hospital and Rehabilitation Center, Eagleville, Pa.	547
Hennepin County Drug/Alcohol Project, Minneapolis, Minn.	196
Professional Youth Services, Perth Amboy, N.J.	81
Spanish Psychosocial Research Center for Mixed Addictions, Miami, Fla.	200
Substance Abuse Project, Collier County Mental Health Center, Naples, Fla.	77
Thee Door Substance Abuse Program, Orlando, Fla.	90
Rubicon,[1] Richmond, Va.	28
	N=1,544

[1]Administratively withdrawn from the NDACP.

self-ratings, etc.) and postprogram measures at 8 and 16 months followup (e.g., substance use, criminal involvement, work status, social activity, etc.). The major finding from that study was that behavioral change outcomes in combined treatment were not significantly different from those resulting from separate treatment. Moreover, neither alcoholics nor heroin users responded any differently to combined treatment than they did to separate treatment. Differences did exist between individual treatment units within same modalities with regard to client outcome.

Also presented are the findings of a recently completed Veterans Administration study which examined outcomes associated with service delivery at combined (alcohol and other drugs) units and seven alcohol-dependent units. In that study, alcohol-dependent individuals viewed the traditional treatment settings more positively than the combined setting. Moreover, alcohol clients admitted to traditional settings saw themselves as showing greater progress regarding substance use, vocational improvement, and family relations than did those alcohol clients admitted to combined treatment settings. Similar differences did not exist for drug abuse clients admitted to traditional and combined treatment units.

Chapter 5 discusses the occurrence of alcohol abuse among heroin addicts and the effect that alcohol has on patient treatment and outcome. This study was carried out by Eagleville Hospital and included a sample from the Eagleville therapeutic community (N=280) and 10 methadone maintenance programs in the Greater Philadelphia, area (N=586).

Those addicts who were also problem drinkers were seen to have significantly more social and psychological problems than those addicts who were not problem drinkers. Drug use and drug-related problems measured prior to treatment and at treatment completion were significantly reduced in both the Eagleville and methodone maintenance cohorts. A general conclusion of the study was that alcohol problems at intake were significantly associated with alcohol problems occurring after entrance into treatment and at followup.

Heavy drinking and problem drinking, both before and after admission to treatment for drug abuse, were found to be associated with poorer treatment outcomes. However, intake measures of alcohol and of alcohol-related problems did not predict non-alcoholic-drug use and/or drug-related problems at followup. Virtually none of the outcome variance in regard to these two latter variables was explained by alcohol use pretreatment.

The findings of this study also addressed the issue of the relationship between methadone maintenance and later alcohol abuse. Presence or absence of alcohol problems was unrelated to length of time receiving methadone.

CHAPTER I

Introduction

Stephen E. Gardner, D.S.W.

BACKGROUND

The National Drug/Alcohol Collaborative Project (NDACP) was a project jointly sponsored by NIDA and NIAAA to address issues arising from the prevalence of mixed (drug and alcohol) substance abuse. A variety of problems have been suggested and in many instances documented regarding the combined use of substances. Physical dangers associated with the concurrent use of different substances (e.g., alcohol/sedatives) are well known. There have also been reports of alcohol abuse in methadone maintenance programs, such that alcohol use has interfered with methadone treatment and/or alcohol abuse has developed as a major problem. It has been suggested also that multiple substance abusers present more difficult treatment problems than do single substance users.

As a result of the growing recognition of this problem, meetings involving representatives of NIDA and NIAAA were held in the early part of 1974 to review the situation and to determine what steps could be taken.

Part of the Federal response resulting from these meetings was the development and issuance of new guidelines pertaining to the preparation and submission of applications for joint drug/alcohol demonstration projects. Grants for alcoholism demonstration projects had been authorized under the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act of 1970 (Public Law 91-616). The Drug Abuse Office and Treatment Act of 1972 (Public Law 92-255, Section 410) authorized grants for the purpose of determining causes and developing methods for dealing with drug abuse in specialized (demonstration) areas.

The guidelines for the new combined drug/alcohol projects provided support for programs which--

(1) Provided for demonstration, treatment, and rehabilitation programs for population groups experiencing mixed substance abuse and/or addiction;

(2) Established, conducted, and evaluated mixed substance treatment and rehabilitation programs with State and local criminal justice systems; and

(3) Developed and implemented special demonstration projects in which both alcohol and drug problems are prevalent.

A rigorous research design was necessary for any project that received support so that program activities and substance abuse characteristics of potential clients could be carefully described, and so that knowledge and information could be generated for use extending beyond the specific project.

For operational purposes, the NDACP commenced on April 8, 1974, based on a memorandum of agreement (NIDA/NIAAA) to jointly fund programs that met the above criteria. Ten programs ultimately became part of this project, with 8 programs receiving support from NIDA and 2 programs being supported by NIAAA. This collaborative venture resulted in an overall design to--

(1) Carry out and evaluate combined treatment techniques--i.e., to determine the efficacy of treating single substance abusers (alcohol or drug) and/or multiple substance abusers (alcohol and drug or drug and drug) within a single facility and/or modality;

(2) To administer a comprehensive substance abuse interview to clients in the 10 programs (which included a wide range of geographic locations) in an effort to determine patterns and consequences of single and multiple substance abuse; and

(3) To determine the kinds of substance abusers who could be drawn into demonstration programs designed specifically to serve mixed (drug/alcohol) substance abusers.

One of the primary purposes of the project was to evaluate, through the experiences and findings of the 10 participating programs, the utility of having both a drug and alcohol treatment capability within 1 facility/modality. It was never anticipated, however, that the results of the 10 programs would be generalized per se to other programs. Rather, by describing the goals, processes, and findings of the demonstration programs, other agencies might be able to make their own assessments regarding what might "work for them."

The NDACP was structured as a collaborative project with each of the participating programs organized to contribute data to a central data base. Eagleville Hospital and Rehabilitation Center (EHRC), Eagleville, Pennsylvania, was chosen to help develop a uniform instrument, collect the data, and manage the central data system. Eagleville had been a major proponent of the combined (drug and alcohol) treatment approach and was in the process of conducting a research project in this specialized area. Since 1 of the objectives was to conduct an assessment of clients in all 10 programs, a common instrument needed to be developed, pretested,

and utilized in each of the programs. Mechanisms had to be established so that the results of all programs could be aggregated and easily accessed. The gathering and analysis of data was considered complementary to the individual program's other evaluation needs and objectives. EHRC also provided interview training for representatives in each of the 10 projects so that the reliability of data collected at the local program level would be improved.

This report, based on the results of the NDACP effort, attempts to communicate to treatment personnel, program administrators, researchers, and policymakers at the local, State, and Federal levels the findings of the NIDA/NIAAA jointly funded and monitored project. Hopefully, the report will provide some understanding of the kinds of multiple substance abuse problems confronted as well as the impact of programmatic efforts that were designed to alleviate the problems.

CONTENTS OF THE REPORT

Chapter 2, "Multiple Substance Abuse: A Review of the Literature," attempts to provide some conceptual and historical definition of multiple-substance-taking behavior. Medical hazards of different substance combinations as presented in the literature are provided; brief discussion of the various data systems that attempt to document use patterns is presented. Finally, literature that discusses drug use by alcoholics and alcohol use by drug addicts is included.

Chapter 3, "Description of the Total Client Sample, Analysis of Substance Use Patterns, and Individual Program Descriptions," presents findings regarding substance use over all programs as well as consequences of that use, demographic and psychosocial characteristics of the sample, and descriptions of the participating programs.

The investigation of substance abuse among the drug- and alcohol-dependent persons was extraordinarily comprehensive: lifetime and recent ("last 3 months") use of substances in 14 categories was studied. The substance categories studied were: alcohol, heroin, other opiates, amphetamines, barbiturates, minor tranquilizers, marijuana and hashish, methadone, cocaine, hallucinogens, inhalants, over-the-counter drugs, antidepressants, and major tranquilizers. In addition, data on smoking and the consumption of coffee and tea were gathered.

The relationship of the number and types of substances used to physical and psychological consequences due to drug and/or alcohol use was also examined. The investigators also attempted to relate use of different substances to a series of demographic and psychosocial variables.

Chapter 4, "Evaluation of Eagleville's Residential Combined Treatment Program," presents the findings of an experimentally designed study to examine the efficacy of treating drug and/or

alcohol abusers separately and together. As is indicated in the title, this study was conducted at Eagleville and included a total of 688 clients that were randomly assigned to 3 study groups.

Chapter 5, "The Problem Drinking Drug Addict," presents the methodology and findings of a second study conducted at Eagleville. This study attempted to examine the nature and extent of alcohol use in a drug-abusing sample as that use related to treatment outcome. Clients in 10 methadone maintenance programs and clients at the EHRC short-term residential program were examined along a number of outcome variables, both as separate samples and as one group.

It is hoped that this report will provide some informative discussion relating to what has been identified as an ever-increasing problem--multiple substance abuse. Although the 10 treatment programs to be discussed briefly in the report are not suggested as model programs, the reader should be in a position to review the types of treatment approaches that were developed to serve mixed (drug and alcohol) substance abuse, and to learn from those.

CHAPTER II

Multiple Substance Abuse: A Review of the Literature

Jerome F.X. Carroll, Ph.D., Thomas E. Malloy, M.A., and Fern M. Kendrick, B.A.

INTRODUCTION

In contrast to the findings of numerous recent studies which demonstrate high prevalence of multiple substance abuse among many age and social groups, the field of substance dependence has tended to remain organized along substance-specific lines. In particular, during the middle third of this century, treatment of alcoholics and opiate addicts has in general been segregated physically, attitudinally, and by means of distinct funding sources. This segregated approach is reflected in the existence of two Federal agencies, one for the study and treatment of alcohol and related problems (National Institute on Alcohol Abuse and Alcoholism--NIAAA) and the other for similar projects pertaining to drugs (National Institute on Drug Abuse--NIDA).

The increasing occurrence of serious sequential, alternating, and concurrent involvement with two or more substances (including alcohol), however, has raised questions about the need for different prevention and treatment approaches. In this chapter, literature pertaining to the history, extent, and reported patterns of multiple substance abuse will be examined. This review will provide the background against which the findings of NDACP can later be discussed.

DEFINITIONS

Multiple substance abuse (MSA) refers to the self-administered use of psychoactive agents from two or more pharmacological categories in a way that deviates from established medical and/or social norms, and which is damaging to the individual or the social group. These substances have been found to be abused in sequential, alternating, or concurrent patterns. The term "substance use" rather than "drug use" is employed to describe

numerous drug patterns that may include alcohol. Experimental drug use, limited in intensity and duration of involvement, was not included in the consideration of multiple substance abuse in this report.

Ancillary use reflects serious involvement with a substance to sustain or support the effects of a more frequently abused substance, or as a substitute for the other substance.

Sequential abuse refers to serial involvement with two or more substances, such as alcohol abuse followed by opiate abuse. In this progression, however, the substance abuser may return to the original substance category, abandoning later ones, thus establishing a pattern of alternating substance abuse. After detoxification from opiates, for example, many addicts with pre-heroin histories of problem drinking resume alcohol abuse.

Concurrent multiple substance abuse refers to involvement with two or more substance categories in such a fashion that the effects overlap. Examples include the use of one agent to alter the effects of an agent from another category through augmenting, counteracting, or modifying action.

DIFFICULTIES IN STUDYING SUBSTANCE ABUSE

The standard sources of data on substance-dependent samples (e.g., urine surveillance, agency record, and patient self-reports) all have unsatisfactory features. Patient self-reports are particularly difficult to interpret, since many substance-specific-treatment programs do not knowingly admit or retain a patient who acknowledges the abuse of other substances. Thus, patients often withhold information, and program staff at times fail to report information on substance abuse which is inconsistent with their services mandate.

Another problem is the use of information obtained from known substance abusers since these individuals may not be representative of the total substance-abusing population. Although the study of available substance-dependent subsamples can reveal much about substance abuse patterns, it may not be possible to construct a realistic picture of substance abuse in the general population from the results of several unrepresentative samples (Johnson 1973). For a more thorough discussion of methodological problems in substance abuse research, the reader is referred to Sadava (1975).

There also were frequent difficulties encountered in interpreting published reports, due to the lack of clear definitions of alcohol and drug abuse. Nonuniform use of such terms as "alcoholic," "problem drinker," "alcohol abuse," and "drug abuse" made it difficult both to compare results of the different studies and to estimate the magnitude of the phenomenon under investigation. In addition, diagnostic criteria were generally not provided, and

there was often a failure to specify the particular substances and the amounts abused.

- Due to the limitations posed by inadequate definitions and inconsistent use of terms, only studies in which subjects received criteria-based diagnoses of alcoholism or problem drinking were considered.

GENERAL OVERVIEW

Medical Hazards Associated with Multiple Substance Abuse

Although the precise contributions of various substances abused in mixtures is not entirely clear, it has become evident that a variety of medical and psychiatric sequelae are associated with multiple substance abuse. Multiple substance abuse has been associated with the lethal systemic vascular disease, necrotizing angiitis (Citron et al. 1970), and has been reported to present new difficulties to medical practitioners due to the increased and not always predictable complexities involved in detoxification (Berle et al. 1972; McKenna et al. 1973; Wesson 1972; Wesson et al. 1971). In addition, new medical emergencies, including overdose, have resulted from the combined effects of two or more drugs (Gay 1971, 1972; Stimmel et al. 1973). The National Drug Abuse Warning Network (DAWN) statistics for 1975-76 show that two or more substances are frequently involved in drug-related deaths and visits to hospital emergency rooms.

It is frequently difficult to differentiate sequelae of substance abuse from predisposing pathology antedating the use of substances in the assessment of psychiatric problems. Smith et al. (1975) reported that polydrug abusers appeared to manifest greater psychopathology than single substance abusers as indicated by higher scores on the MMPI. Others have attributed cerebral dysfunction specifically to polydrug abuse (Adams et al. 1975). In contrast to some findings, Bruhn and Maage (1975), Judd and Grant (1975), and Grant et al. (1976) observed that heavy use of central nervous system depressants was related to mild but definite neuropsychological impairment still apparent 2 months after completion of withdrawal from such substances. Protracted toxicity has also been reported for amphetamines (Lemere 1966), hallucinogens (Cohen et al. 1967), and marijuana (Kolansky and Moore, 1971, 1972). Others have contended that at least some of the toxic effects, such as chromosomal damage and teratogenicity attributed to particular agents, may actually have resulted from the use of combinations of substances (Gilmore et al. 1971; Dishotsky et al. 1971; Irwin and Egozcue 1967). Tucker et al. (1972), however, found that among a group of psychiatric inpatients with histories of multiple substance abuse the occurrence of thought disorders was related more to prior duration of drug abuse than to specific drugs abused.

Recognition of the Multiple Substance Abuse Problem: Early Reference

During the latter half of the 19th century, the sequential abuse of alcohol and opiates received medical recognition (Terry and Pellens 1928). Marked alcohol-related problems prior to opiate addiction were noted also by Kolb (1962) in his studies at Lexington during the 1920s. Other narcotic addicts were observed to have resumed alcohol abuse during periods of abstinence from narcotics (Pescor, cited by Kolb [1962]), thus exhibiting a pattern of alternating multiple substance abuse.

With the introduction of a broader spectrum of psychotropic medications, more numerous references to multiple substance abuse were found. Haggard and Jellinek (1942) reported on the abuse of sleeping medications by alcoholics. In 1950, Isbell documented the dependence liability of barbiturates and the occurrence of dual opiate-sedative addictions. Lemere (1956) and Pruitt (1957), confirmed the dependence liability of minor tranquilizers, and Glatt (1959), among others, reported evidence of tranquilizer abuse among alcoholics.

The consideration of combined substance treatment strategies began perhaps with the need to develop medically safe detoxification procedures for the increasing numbers of individuals with dual or multiple substance dependencies. Chambers and Moldestad (1970), in comparing samples of addicts admitted to the Federal facility at Lexington, Kentucky, during the 1940s through the 1960s, found that the proportion of opiate addicts who were also seriously involved with the abuse of sedative drugs had increased from 8 percent in 1944 to 54 percent in 1966. Further reports of barbiturate-sedative involvement among narcotic addicts in the 1960s were provided by others (Hamburger 1964, Laskowitz 1967; Cumberlidge 1968; Chambers 1969).

Recent Reports on Multiple Substance Abuse: General Population

The results of surveys of substance use and abuse patterns among young people in this country indicate that the prevalence of use and abuse of all classes of psychoactive drugs has increased during the last decade (O'Donnell 1976). The growing awareness of multiple substance abuse as a serious phenomenon within our culture is reflected in the vast number of substance use studies which have been generated during the past 8 years. Substance involvement has been observed throughout all racial groups and social strata (Smith et al. 1970; Smith and Luce 1971; Smart and Fejer 1975; Single et al. 1975).

In a study involving 8,665 Toronto high school students, Smart and Fejer (1972) noted that adolescents reported being involved with many of the same substances as their parents. The data indicated that the heightened and varied substance use and abuse of the 1960s crossed generation lines, with some parents apparently serving as models for substance-taking behavior. Klonoff and

Clark (1976) noted a clear trend of multiple substance abuse among a sample of "local counterculture" adults who smoked marijuana regularly.

Of particular importance of findings that serious involvement with one substance, whether licit (cigarettes or alcohol) (Lavenhar et al. 1972; Block 1975) or illicit, is associated with an increased likelihood of involvement with other substances. Thus the probability of multiple substance abuse was significantly greater among daily users of marijuana than among experimental or less than daily users (Single et al. 1975). These data suggest that current treatment and prevention approaches should not be restricted to the single substance approaches that have dominated the field during the last few decades.

Multiple Substance Abuse Among Drug Abusers in Treatment

Federal interest in the nature and extent of substance abuse has led to the development of four national data systems: the Drug Abuse Reporting System (DARP); the Client Oriented Data Acquisition Process (CODAP); the Drug Abuse Warning Network (DAWN); and the Alcohol Treatment Center Monitoring System (ATCMS), now called the National Alcoholism Program Information System (NAPIS). Although none of these data systems was designed specifically to investigate multiple substance abusers per se, the information obtained from these data bases may be useful.

In 1969 the National Institute of Mental Health (NIMH) contracted with the Texas Christian University's Institute on Behavioral Research (IBR) to establish and maintain a patient reporting system (Drug Abuse Reporting Program (DARP)) for NIMH-supported drug abuse treatment programs, as a data base for treatment outcome evaluation research. As of March 31, 1974, there was a computerized file of longitudinal records on 43,931 patients from 52 agencies.

In the first study to utilize DARP data, Simpson and Sells (1974) reported that 60 percent of 11,380 patients claimed to have abused 2 or more substances. In a subsequent DARP cohort of 28,419 patients entering treatment from 1971 to 1973, the percentage of multiple substance abusers appeared to have increased to 68 percent (Simpson 1976), suggesting a rise in the trend toward multiple substance abuse among drug abusers seeking treatment.

The Client Oriented Data Acquisition Process (CODAP), is a reporting system initiated by SAODAP and used by the National Institute on Drug Abuse to collect drug use, employment, treatment, and criminal justice data, among others, from all clients that are being treated in programs that receive Federal funding. It serves the purpose of monitoring Federal treatment slots to different programs and providing descriptive information regarding client loads.

The major CODAP unit of analysis is a "drug problem," defined as any use of a drug which is perceived and reported to be "problem related." It was observed that significant percentages of individuals in treatment were involved in a variety of patterns of multiple substance abuse (Bardine 1976). The corresponding proportions of primary amphetamine and primary opiate abusers with alcohol problems were 17 percent and 6 percent, respectively. Moreover, 90 percent of primary barbiturate and sedative abusers had secondary or tertiary drug problems of any sort; primary amphetamine users, 88 percent; and primary opiate users, 50 percent.

The Drug Abuse Warning Network (DAWN) is a national information gathering system funded and monitored jointly by the Drug Enforcement Administration, Department of Justice, and the National Institute on Drug Abuse designed for early detection of substance abuse trends. The purpose of the DAWN system is to gather, interpret, and disseminate data on drug abuse from 24 Standard Metropolitan Statistical Areas (SMSAs) in the United States. Emphasis is on serious consequences resulting from drug use as is evident from the units from which data are collected: emergency rooms, crisis centers, and medical examiners. Two findings reported by DAWN are of particular interest with respect to multiple substance abuse. First, the number of cases reported in hospital emergency rooms, crisis centers, and coroners' offices which were related to alcohol ingestion in combination with other substances (alcohol-in-combination) has steadily increased. For the period 1973-74, the average monthly mention for alcohol-in-combination was 1,303; for 1974-75 the monthly average increased to 1,662; and for 1975-76 to 1,929. Secondly, during the 1975-76 period, the number of drugs involved per episode (visit, contact) reported by participating crisis centers was 1.3; by emergency rooms, 1.4; and by medical examiners, 1.9. The weighted mean for all three types of reporting facilities was 1.4. Thus, the data suggest that substance abuse of a life-threatening nature often involves more than one substance.

The National Alcoholism Program Information System (NAPIS) was implemented in May 1977. According to a recent report by the Research Triangle Institute (Tuchfeld et al. 1975), NAPIS data on 13,610 individuals receiving treatment in alcoholism centers indicated that only 15 percent were reported to be abusing other substances. Clinicians' impressions, however, indicated that a higher percentage were using (as opposed to abusing) other substances.

In summary, despite the limitations; information obtained from the four national data systems has indicated that substantial proportions of substance abusers enrolled in treatment programs are involved in multiple substance abuse patterns. The magnitude of this phenomenon ranged from an estimated 15 percent among NAPIS alcoholic clients to 90 percent among primary bartiturate and sedative abusers reported by CODAP. In addition, multiple substance abuse appears to be associated with life-threatening medical consequences.

Corroborating data have been collected by the National Drug/Alcohol Collaborative Project (NDACP), which is a series of special demonstration programs designed to reach and treat mixed substance (drug and alcohol) abusers. The data indicate that among patients attending a variety of treatment programs, clients indicating multiple substance abuse present consequences that are more severe than those presented by single substance abusers.

Etiologic Considerations

The compulsive use of drugs or alcohol is considered to be a behavioral disorder, the origins of which remain obscure. Despite hundreds of studies, no single social, developmental, personality, or genetic factor has been found to be consistently associated with drug dependence, although evidence implicating factors in all of these areas has been reported. While a detailed discussion of the etiology of substance abuse is beyond the scope of this report, a few aspects with implications for treatment are mentioned briefly.

Overproduction and overprescription of sedatives and minor tranquilizers (Pekkanen 1976; Bowes 1974) and vigorous drug-oriented media advertising campaigns (Fort 1969) have been seen as contributing to the availability, acceptance, and widespread use and abuse of these substances in many segments of society.

Adverse social conditions including discrimination, poverty, overcrowding, unemployment, and denial of opportunities for personal growth and fulfillment have been found to be correlated with substance abuse, although these conditions fail to occur invariably as either correlates or antecedents. Thus the interaction of social and other factors must be more carefully studied to obtain a more accurate understanding of the precise role played by social forces in the etiology of substance abuse.

A developmental factor found to be of some significance in substance abuse is parental loss, whether through death, desertion, marital breakup (Robins and Murphy 1967; Vaillant 1970; Tennant et al. 1975) or the inability of parents to relate emotionally to their children (Woody 1972; Levy 1972). Substance abuse by parents may also provide models for similar behavior in children (Kandel 1974, 1975; Goodwin et al. 1975; Lavenhar et al. 1972) and the degree to which nonconformity is tolerated in the home may be contributing factors.

The psychoanalytic view links substance abuse to libidinal impulses, especially in the realm of oral erotic fantasy (Freud 1953). Abraham (1927) contended that alcoholism was related to sexual conflicts, with drinking permitting the release of repressed sexual impulses. While there has been some concession to pharmacologic variation in the effects of different substances on mood (Rado 1933), the early psychoanalytic view of addiction was generic. Addicts and alcoholics were thought to share similar psychodynamic processes, and the concept of an "addictive personality" was advanced (Rado 1933). This concept has been contested by recent findings (e.g., Ling et al. 1973), and it is generally

acknowledged that classic psychoanalysis has been of limited value in the treatment of addictions.

Personality trait studies of addicts and alcoholics suggest that there are many subgroups of substance-dependent individuals. Although there appear to be a high proportion of sociopathic character disorders among compulsive substance abusers, other psychiatric diagnoses have also been made (e.g., Ling et al. 1973).

In recent years, studies have emerged suggesting that a biologically determined predisposition toward substance abuse may be involved in the etiology of alcoholism (Winokur et al. 1970, 1971). Although other addictions have not been studied specifically in this regard, the possibility of one or more underlying biological predispositions has not been excluded.

In sum, the etiology of substance abuse is ~~complex, involving~~ biological, psychological, family, and societal factors. Given the multidetermined nature of substance abuses, and the variety of subgroups which make up the addict world, a generic approach to the treatment of the addiction requires more careful consideration.

In the remainder of this chapter the two subpatterns of multiple substance abuse are discussed in greater detail: drug abuse by alcoholics and problem drinkers, and alcohol abuse by drug-dependent persons.

DRUG ABUSE BY ALCOHOLICS AND PROBLEM DRINKERS

A growing body of clinical data suggests that significant proportions of individuals who abuse alcohol also abuse other substances and, further, that concern about this pattern of multiple substance abuse is justified. The more blatant hazards of such combined substance abuse have been documented repeatedly in reports of overdose deaths and suicides, as well as the more dramatic social sequelae in highway deaths, homicides, and other crimes of violence.

In a review of the literature from 1925 to 1972, Freed (1973) concluded that approximately 20 percent of alcoholics used at least one other dependence-producing drug. In a study of NIAAA-funded alcoholism treatment programs conducted by the Research Triangle Institute (RTI) in three regions of the United States, Tuchfeld et al. (1975) reported that, according to the clinicians interviewed, 30 to 60 percent of all clients were using drugs in addition to alcohol at time of admission. About one-half of these alcoholics (or 15 to 30 percent of total) were thought to be "abusing" drugs (using illicit drugs or drugs which were not medically prescribed). Interviews with alcoholic patients indicated that in the previous 6 months about 35 percent had obtained prescriptions

for psychotherapeutic drugs from private physicians, and approximately 50 percent were using some form of drug.

The RTI study also indicated that multiple substance abuse among alcoholics was positively correlated with youth (age under 30 years) and with being white, female, and of middle or high socioeconomic status. Further, alcoholics involved in illicit or nonmedical drug abuse were perceived by clinicians as less motivated and less conforming to program expectations.[1] These factors may have contributed to the lower retention rates seen in this subgroup of alcoholics in treatment.

Barbiturates, nonbarbiturate sedatives, and minor tranquilizers have reportedly been abused singly or in combination by approximately 15 to 40 percent of a variety of groups of hospitalized alcoholic patients (Ford 1956; Glatt and Judge 1961; Glatt 1962; Kendell and Staton 1966; George and Glatt 1967; Bartholomew and Sutherland 1969; Rosen [illegible] 1969; Curlee 1970; Rathod and Thompson 1971; Devenyi and Wilson 1971).

Of particular significance were the objective findings obtained through the use of thin-layer chromatography on 100 consecutively admitted acute alcoholic inpatients (Chelton and Whisnant 1966). Thirty-eight percent of these patients were found to have evidence of barbiturates, meprobamate, or phenothiazines in urine sampled at admission. Moreover, combinations of these substances were detected in a significant percentage of cases. It is important to note that only 9 percent of the patients reported drug use at intake. Thus, more than four times as many alcoholics had taken drugs as admitted so on questioning. Similarly, Devenyi and Wilson (1971) noted that in 8 percent of 100 cases urine samples obtained from alcoholics revealed the presence of barbiturates, although all patients denied barbiturate use at time of admission.

Significant as these urinalysis findings are, they are probably underestimates, since many factors militate against finding evidence of substance abuse in urine samples (Carroll and DiMino 1975).

It is likely that self-reports of drug abuse by alcoholics lead to considerable underestimation of the true prevalence. Two frequently encountered factors which militate against valid self-reports of drug abuse are residual intoxication with alcohol and/or drugs (which among other effects may interfere with memory), and distrust of the admitting institution.

Dependence on central nervous system depressants, both psychological and physical, was reported for approximately 5 to 10 percent of alcoholics in several studies (Ford 1956; Glatt and Judge 1961, Kendell and Staton 1966); and Bardine[1] reported sedative-hypnotic-related problems in nearly 8 percent of a large

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[1] A. L. Bardine: personal memorandum to Barry S. Brown, NIDA Services Research Branch, January 28, 1976.

sample of excessive drinkers. It is probable that these percentages represent underestimations of involvement, since only very blatant signs of ancillary sedative dependence would be distinguished from those related to alcohol.

Smaller percentages of alcoholics have been reported to show evidence of significant involvement with amphetamines. The data from several studies of amphetamine abuse by alcoholics ranged from approximately 1 to 4 percent (George and Glatt 1967; Sclare 1970; Bardine[2]). Higher percentages of criminal alcoholics were involved in multiple substance abuse (Bartholomew and Sutherland 1969); 25 percent had long histories of heavy barbiturate and amphetamine abuse, suggesting that the multiple substance abuse is part of a larger pattern of deviant behavior.

Between 3 and 6 percent of alcoholics in several studies reported opiate involvement (Ford 1956; Ditman et al. 1970; Bardine 1970). Again, the percentage of alcoholic prisoners with histories of opiate abuse was several times greater (Bartholomew and Sutherland 1969).

Despite variations in reporting, it can be concluded that a relatively small percentage of alcoholics abuse other substances. Such multiple substance abuse patterns are associated with sufficiently harmful medical and social sequelae to warrant concern. Tuchfeld (1975) has reported, moreover, that as a group, alcoholics involved in nonmedical or illicit drug abuse have lower retention rates in alcoholism treatment programs than their non-drug-abusing counterparts.

ALCOHOL ABUSE BY DRUG-DEPENDENT PERSONS

Hazards Associated with Alcohol Abuse by Drug-Dependent Persons

The abuse of alcohol by drug-dependent individuals has become a matter of increasing concern both to researchers and clinicians in the field of substance abuse. The risk of medical consequences and potentially lethal effects associated with the abuse of more than one psychoactive agent has been well documented (Sells et al. 1972; Barr et al. 1978; Watterson et al. 1975). Full recognition of the hazards of concurrent alcohol and drug abuse, however, is more recent, particularly with respect to alcohol use among heroin addicts (Helperin and Rho 1966; Jackson and Richmond 1971, 1973; Baden 1971, 1972a,b; Cherubin et al. 1972; Chabalko et al. 1973; Garriott and Sturner 1973; Malikin 1973; Bihari 1974; Haberman and Baden 1974). The potentially

[2]See footnote 1.

life-threatening nature of alcohol abuse by opiate addicts is attributed to two factors. One is the synergistic depressant effect of alcohol and heroin on the central nervous system. The other relates to the more careless preparation and use of heroin (or other drugs) by individuals already under the influence of alcohol. It is obvious that these two factors can, and probably do at times, operate simultaneously.

Although viral hepatitis has been viewed as the primary cause of liver damage among opiate-dependent persons (Levine and Payne 1960), it has recently been suggested that alcohol abuse by addicts maintained on methadone may be a significant factor contributing to liver damage in this group (Stimmel et al. 1971, 1972; Bihari 1974; Maddux and Elliott 1975).

Traffic violations associated with concurrent drug/alcohol abuse have also received attention. Finkle et al. (1968) reported that among a sample of 3,409 arrests for drunken driving, indications of drug abuse also were noted in 21 percent of the cases. Thus, in addition to the increased social dysfunction and failure in treatment programs, alcohol abuse by drug-dependent individuals is associated with illnesses and accidents.

References to Alcohol Abuse Among Drug Addicts

In 1884, Mattison described a case of iatrogenic morphine addiction that was complicated by the excessive use of brandy. This case and others like it received only casual attention by the medical profession. In one study of 230 drug-dependent persons, Kolb (1925) found that 20.5 percent were "inebriates" (i.e., they had a history of periodic drinking with sprees).

The abuse of alcohol by patients admitted to mental hospitals for drug addiction and drug-related psychoses was investigated by several groups. Among 475 patients first admitted to a mental hospital for drug psychoses, 38 percent were further classified as "intemperate" (Moore et al. 1941; Gray and Moore 1942). By modern definitions based on the medical and psychosocial consequences of drinking, these individuals would be considered alcoholics or problem drinkers. Among 136 readmissions for drug-related psychoses from the same group, 65 percent were classified as "intemperate." Similar results were reported by Malzberg (1949) and Knight and Prout (1951).

In the first half of this century, serious sequential, concurrent, and alternating drug and alcohol abuse patterns were all reported. Although the prevalence rates were not determined, it is clear that these forms of multiple substance abuse have been ongoing phenomena for many decades. However, it was not until the recent proliferation and availability of greater numbers of drugs that medical and social interest in multiple substance abuse and related problems became significant. It has, for example, become clear that alcohol is almost invariably the first psychoactive agent abused by adolescents (Single et al. 1975), including those who

later become opiate addicts (Schut et al. 1973). Moreover, evidence indicates that alcohol use tends to occur at younger ages in those who later abuse alcohol and/ or other drugs (Vaillant 1970; Tennant and Detels in press).

Alcohol abuse prior to the development of drug addiction is a common occurrence. Weppner and Agar (1971) reported evidence of alcohol abuse prior to narcotic addiction in approximately 22 percent of 738 addicts. Of the 446 addicts who had been "hooked" (physically dependent) on another drug prior to heroin, nearly 18 percent reported that alcohol abuse was an "immediate precursor" to heroin dependence. Demographic analysis indicated that the addict subgroup evidencing prenarcotic histories of alcohol dependence tended to include more blacks, females, older persons, and persons addicted to opiates for less than 6 years.

In another investigation of the precursor role of alcohol in narcotic addiction, Rosen et al. (1975) reported that 68 percent of a sample of predominantly white addicts in treatment had abused alcohol prior to becoming dependent on another drug. Abuse was defined as loss of control over drinking and the occurrence of alcohol-related medical or psychosocial problems. During periods of active opiate abuse, the majority of the addicts reportedly decreased their drinking, although about one-third continued to drink excessively (a concurrent abuse pattern).

From several studies of addicts who have been withdrawn from heroin, it is clear that alcohol abuse frequently occurs during periods of abstinence from opiates. Such alternating drug dependence was also reported by O'Donnell (1964) in a followup study of narcotic addicts who underwent detoxification at the Federal facility at Lexington, Kentucky. It was learned that during followup 17 percent of 122 addicts had become addicted to barbiturates or alcohol (no distinction made).

These results were corroborated by Vaillant (1966) in a study of 30 opiate addicts who had maintained "stable abstinences" from heroin for at least 3 years. These individuals were found to have substituted a variety of behaviors for previous heroin-related activities, including the use of alcohol. In fact, in 47 percent of the cases, the major substitute was alcohol. While some of the addicts drank to excess only during the first year of abstinence, four addicts sustained "heavy drinking" practices over the years, and six others used alcohol to such an extent as to impair health or social functioning.

Abuse of Alcohol by Opiate Addicts Maintained on Methadone

Many addicts continue to abuse alcohol despite the development of dependence on other substances (Rosen et al. 1975; Jackson and Richman 1973; Perkins and Bloch 1970). In particular, alcohol abuse among clients maintained on methadone has been reported and has been associated with the rapid development of medical problems (Bihari 1974), and higher than average rates of treatment failure (Gearing 1970; Bihari 1974).

Through the use of a variety of screening procedures designed to detect drinking problems among addicts applying for admission to treatment programs, information pertaining to the drinking practices of these individuals during periods of active involvement with heroin has become available. The data suggest that substantial proportions of active heroin addicts continue to abuse alcohol.

Jackson and Richman (1973) observed that more than 27 percent of 471 consecutive heroin addict applicants at a detoxification program reported daily drinking, averaging 4 pints of wine per day. High levels of drinking were more commonly noted among black and older addicts.

More than a third of 100 male drug addicts reported excessive drinking at time of admission to the Eagleville Hospital and Rehabilitation Center (Barr et al. 1974). Psychological dependency on alcohol was observed in 52 percent of the total sample, as manifested in attempts to manage or obtain distance from life problems through the use of alcohol. Cohen (1975) also reported that approximately one-third of a large sample of heroin addicts were abusing alcohol at time of admission to treatment.

Perkins and Bloch (1970) observed that 10 percent of 360 heroin addicts admitted to treatment at the Bernstein Institute (New York City) were viewed as abusing alcohol. A higher rate of problem drinking, 16 percent, was noted in rejected applicants. At time of admission to another methadone maintenance program (Williams and Lee, 1975), 25 percent of a retained group and 33 percent of a group of dropouts were considered alcohol abusers, as manifested in role or social problems (Schut et al. 1973). However, it is important to note that program exclusion criteria were not described in this study.

An interesting investigation carried out by Harford et al. (1976) suggests that the prevalence of alcohol abuse among heroin addicts applying for treatment is considerably greater than indicated by estimates obtained through the use of traditional questionnaire techniques. Prior to questionnaire administration, breathalyzer tests were administered to one group of applicants at a methadone maintenance program. On the alcoholism diagnostic instrument (questionnaire), 50 percent of the patients who had taken the breathalyzer test acknowledged drinking problems, whereas only 25 percent of addicts who had not been tested by breathalyzer acknowledged similar problems. Thus, perhaps twice as many addicts suffer drinking problems as admit to them when applying to treatment programs, suggesting that the alcohol abuse is far more prevalent among addicts actively involved in opiate abuse than treatment application data imply.

Although methadone maintenance treatment has been linked by some with alcohol abuse, assessment of the prevalence rates reported in most studies suggests that there is little difference in the alcohol abuse rates occurring during long-term methadone maintenance as compared with pretreatment periods (Brown et al.

1973; Maddux and Elliott 1975). Gearing (1970) reported that 7 to 8 percent of large samples of methadone maintained patients in New York City had problems with alcohol (problem implied alcohol-related interference with patient management). Similarly, Perkins and Bloch (1970) found that 8 percent of a sample of 486 patients maintained on methadone for 1 year had problems with alcohol. It is important to note that in this study no increase in alcohol problem rate was observed from time of admission to 1-year evaluation, even when dropouts were taken into consideration.

One study, however, has suggested that alcoholism rates may increase during methadone maintenance treatment (Scott et al. 1973). A study of a random sample of 120 predominantly Mexican-American patients in a methadone maintenance program showed that 25 percent of the patients fulfilled the National Council of Alcoholism's criteria for alcoholism or suspected alcoholism, or suffered alcoholism symptomatic of psychosis. In contrast, only 5 percent of a sample of 60 consecutive new admissions to the program fulfilled the alcoholism criteria. Thus, it is possible that a significant increase in alcoholism occurred in this program during an average 15 months of methadone treatment. It is worthy of note that Maddux and Elliott (1975) also observed high rates of problem drinking among Mexican-American addicts in methadone maintenance treatment, but in this group, alcohol abuse was prevalent prior to treatment with methadone.

Although the results of the Scott study seem persuasive, it is possible that the study suffers methodological flaws. Green and Jaffe[3] have pointed out that the alcohol-related status of patients at time of entry to the program was determined retrospectively, and through reliance primarily on written records rather than personal interviews. Thus, it was likely that only the most blatant consequences of excessive drinking were noted in the phase preceding admission to the methadone maintenance program, whereas more subtle aspects were observed during the period of treatment.

Bihari (1974) attributed alcohol abuse by methadone maintained patients to underlying psychosocial or psychiatric problems of three general types. First, some methadone maintained addicts were considered to be psychotic and consume alcohol for its antipsychotic sedating properties. Second, there is a group of patients whose normal development was interrupted by the effects of drug involvement during adolescence. Now as adults in treatment, alcohol is used to quell the anxieties generated by belated confrontation with the conflicts of adolescence. Self-defeating family relationships and difficulties adjusting to the "straight" world may also be part of the syndrome.

Lastly, Bihari has described a group of addicts estimated to comprise about 5 percent of the methadone maintenance population

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[3] J. Green, and J. Jaffee: personal communication, 1977.

who suffer from a syndrome characterized by enormous alcohol consumption, restlessness, distractibility, short attention span, inability to delay gratification, argumentative interpersonal style, distrust, and a tendency toward violent fantasies and impulses, with intense related anxiety. Bihari postulated that these patients drink alcohol in order to quell the anxiety associated with their fantasies (1974).

Others have suggested that alcohol abuse by methadone maintained patients reflects the increased need to experience "highs" (Schut et al. 1973; Zimmerman 1973).

Although the motivation for heavy alcohol consumption by methadone maintenance patients has been attributed to two sources, one based on underlying psychiatric and psychosocial adjustment problems and the other on a desire for "highs," the two explanations are not at all contradictory. In fact they may be complementary, and possibly both are valid partial explanations of the same phenomenon.

SUMMARY AND DISCUSSION

It is evident that serious involvement in multiple substance abuse is a widespread phenomenon, occurring in all age and social groups. Multiple substance abuse refers to the involvement of an individual in the self-administered use of psychoactive agents from two or more pharmacological categories in a way that deviates from established medical and social norms and which is damaging to the individual or the social group.

A number of problems exist also in attempting to determine the occurrence of multiple substance abuse, including limitations in self-reports data, inadequate agency reporting methods, and unclear definition concerning alcohol and drug abuse.

Significant medical and psychosocial sequelae, moreover, are associated with these substance abuse combinations, including liver damage, increased mortality rates, neuropsychiatric impairment, greater social dysfunction, and decreased retention in treatment programs.

Temporal patterns of substance abuse include sequential, concurrent, and alternating abuse. Among opiate addicts, all three patterns have been described since the early part of this century. Sequential patterns of drug abuse are common, reflecting the many drug-dependent individuals whose abuse of alcohol predated subsequent addiction to other drugs. Concurrent substance abuse is frequently observed in the abuse of tranquilizers and sedative-hypnotics by alcoholics, the abuse of alcohol by narcotic addicts, and less commonly in the abuse of stimulants by both groups. The capacity of barbiturates and other sedative-hypnotics and minor tranquilizers to prevent withdrawal symptoms both from alcohol and one another permits the satisfactory substitution of

these agents for alcohol, and accounts in large part for the concurrent abuse of various combinations of central nervous system depressants.

Alternating patterns of substance abuse have been observed among opiate addicts in the progression from alcohol abuse to heroin dependence (sometimes accompanied by little or no drinking), followed by the resumption of alcohol abuse during periods of abstinence from opiates. Other alternating substance abuse patterns have been described but are not well documented.

Perhaps, consideration of combined substance treatment strategies began with the need to elaborate medically safe detoxification procedures for the increasing numbers of individuals with dual or multiple substance dependencies.

Recent surveys have indicated that prevalence of use and abuse of all classes of psychoactive drugs among young people in this country has increased during the last decade. Despite hundreds of studies, no single social, developmental, personality, or genetic factor has been found to be consistently associated with drug dependence, although in varying degrees evidence from all of these areas has been reported.

In regard to drug abuse by alcoholics and alcohol abuse by drug abusers, there have been varying statistical reports. Percentage of alcoholics abusing one or more drugs varies (usually from 20 to 30 percent) but it can be concluded that a minority of alcoholics abuse other substances. However, based on available data, alcohol abuse by drug addicts is a considerable problem. Alcohol is the precursor substance of abuse for many addicts and many addicts continue to abuse alcohol despite the development of dependence on other substances. In particular, significant percentages of narcotic addicts maintained on methadone maintenance have been reported to abuse alcohol, generally 10 to 30 percent.

Despite claims and theories to the contrary, the preponderance of evidence fails to indicate a clear-cut etiologic link between the alcohol abuse and methadone maintenance treatment of heroin addicts. In the studies that have been conducted there has been little difference between the rates of alcohol abuse reported during pretreatment periods and those reported after long-term methadone maintenance.

CHAPTER III

Description of the Total Client Sample, Analysis of Substance Use Patterns, and Individual Program Descriptions

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INTRODUCTION

This chapter was designed for two major purposes:

(1) To present findings regarding the types of clients that were attracted to 10 demonstration programs that were designed specifically to serve mixed (drug/alcohol) substance abusers along the following dimensions:

   (a) specific drug/alcohol, drug/drug combinations evidenced over lifetime and a recent 3-month period;

   (b) substances used for substitution purposes as well as for altering the effects of the primary substance used;

   (c) examination of medical and psychosocial consequences related to substance usage;

   (d) examination of demographic and psychosocial correlates of different substance combinations; and

(2) To provide a programmatic description of eight drug/alcohol programs that were designed to attract multiple substance users and that would attempt to provide treatment through a combined facility/modality. It should be emphasized that these programs were specifically designed to develop intake procedures and effective referral mechanisms (where necessary), and to provide comprehensive treatment protocols.

In examining both client characteristics and program description, it should be noted that the model treatment programs have been substance specific; i.e., methadone maintenance, Alcoholics Anonymous, Narcotics Anonymous. The initiation and development of a

"combined" treatment approach presents a new and different option for addressing single- as well as multiple-use problems.

METHODOLOGY

Before findings can be presented, it is important to present and document carefully the development of the data-collection instrument that was used in the study.

Data-Collection Instrument

The Data Acquisition Form (DAF) was designed and used for data-collection purposes by the 10 programs. It was developed by, Eagleville staff in collaboration with administration, research, and treatment personnel from the participating programs. Administration of the questionnaire requires 60 to 90 minutes. The interviewers received onsite training from the NDACP management staff and NDACP-trained interviewer supervisors. The instrument is composed of 330 items and covers demographic characteristics, family background, educational status, employment history, reported substance use history, previous treatment experience, sociopathic behavior, and criminality. The DAF items pertaining to substance use made it possible to obtain extensive and detailed histories of reported drug and alcohol use in 14 substance categories. Abuse of a substance was operationally defined as the lifetime use of that substance 15 or more times; less frequent usage was considered "experimental." A person was classified as a substance abuser if he/she used 2 or more substances at least 15 times each during a lifetime period ("ever"). Where alcohol was one of the substances used, if he/she abused alcohol and used another substance at least 15 times during the lifetime period, the person was considered a multiple substance abuser. Use of a substance 15 times or more was an arbitrary number selected by the investigators for defining abuse. The classification of multiple substance abuse during the "last 3-month period" required use of two separate substances at any point in time over the 3 months prior to treatment. Concurrent and/or sequential usage of these substances were not included in any systematic manner in these definitions.

Reliability Measures

To measure the reliability of the DAF interviewing process a test/retest technique was employed. Seven to 12 days after their first interview, 96 clients were asked to repeat those sections in the data acquisition form describing demographics and drug use/abuse variables. Drug abuse items included lifetime involvement with each substance as well as the abuse of each substance in the 3 months prior to admission to treatment. Taking the question about heroin as an example, lifetime heroin use was established by asking, "Did you ever try heroin?" A positive response led to a followup question: "Which of the following best described your use of heroin?" Clients could describe their use

of heroin as experimental (just a few times to try it out); irregular, or regular (nearly every day for at least 1 month).

Drug use during the last 3 months was ascertained through the following question. "During the 3 months prior to your admission (if no admission, first contact with the agency) how frequently and how much heroin did you use?" The frequency and the amount of heroin used in the 3 months prior to admission were then recorded. If clients had not used heroin in the 3 months prior to their admission, the interviewer recorded that fact in a separate entry. Based on these sets of questions each subject received a classification denoting his/her heroin use history.

Clients' responses for each question in the retest were compared to their responses in the first test to determine the proportion of clients giving the same response in both tests. This percent of concordance was utilized as an indicator of reliability. the higher percent of concordance, the greater the number of clients giving identical responses in both tests.

Percent of concordance describing lifetime drug use patterns for the 14 substance categories is provided in table 1. As can be seen, 97.9 percent of the clients reported about lifetime alcohol use in the same manner in both tests. This was the highest rate of concordance for lifetime use of a drug category followed by use ever of antidepressants with 96.9 percent of concordance and the use ever of heroin with 95.8 percent of concordance. The lowest percent of concordance was for the use ever of minor tranquilizers showing a 77.1 percent of concordance. The data in table 1 suggests a high level of concordance for lifetime use of 14 substance categories.

Somewhat similar results are obtained when one examines the use of 12 of these substance categories during the 3 months prior to the client's admission to treatment (table 2). The responses for inhalants were identical for all clients in the test and the retest. It should be noted that none of the clients indicated any inhalant use during the 3 months prior to the interview in either test. Percent of concordance exceeded 90 in responses regarding clients' involvement with over-the-counter preparations, illegal methadone, hallucinogens, cocaine, and other opiates. Concordance in the test and retest regarding the abuse of barbiturates, amphetamines, heroin, and minor tranquilizers varied between 80 and 90. However, the most frequently abused substances, e.g., alcohol and marijuana, had the lowest rates of concordance. 67.7 percent and 70.8 percent, respectively.

These data suggest that about 90 percent of the clients provided the same responses in both the test and retest--a rather high level of reliability for repeated measurements.

Limitations

A major limitation of the data arises from the sample selection procedures. The subjects in the NDACP study were not selected

TABLE 1.—Percent of clients with the same responses (percent of concordance) in the test and retest regarding the use of 14 drug categories--lifetime use

Alcohol	97.9
Antidepressants	96.9
Heroin	95.8
Major tranquilizers	95.8
Over-the-counter	92.7
Illegal methadone	91.7
Inhalants	89.6
Hallucinogens	88.5
Cocaine	87.5
Barbiturates	85.4
Marijuana	83.3
Other opiates	82.3
Amphetamines	78.9
Minor tranquilizers	77.1

TABLE 2.—Percent of clients with the same responses (percent of concordance) in the test and retest regarding the abuse of 12 substance categories--3 months prior to admission

Inhalants	100.0
Over-the-counter	98.9
Illegal methadone	96.8
Hallucinogens	95.8
Cocaine	95.8
Other opiates	90.6
Barbiturates	89.5
Amphetamines	88.5
Heroin	86.4
Minor tranquilizers	80.2
Marijuana	70.8
Alcohol	67.7

to be representative of any one substance-abusing population. First, the choice of the projects from which subjects were to be selected was based not on a scientific plan, but on an administrative decision to utilize programs that were already funded and operational. Further, no attempt was made to obtain a random, stratified sample from the programs participating in the study or to compare the characteristics of the subjects with those of the total population of the projects involved. Rather the sample consisted of the majority of applicants for admission to the 10 demonstration projects designed to treat substance (drug/alcohol) abusers during the period January through July 1976. Thus the study population was not a representative sample of any particular substance-dependent group in this country or even in the 10 participating demonstration projects. Moreover, the timing of the interviews was not consistent among the programs. In four programs, clients were interviewed only after completion of other intake procedures. Therefore, some potential respondents, who dropped out prior to administration of the data acquisition form, were lost, resulting in a further sampling bias.

A second limitation resulted from self-reporting. The degree to which possible inaccuracies of recollection and/or lack of honesty contributed to a lack of validity and reliability is unknown. Many studies that have been performed (Ball 1967; Stephens 1972; Bonito et al. 1976; Maddux and Desmond 1975; Cox and Longwell 1974) have indicated generally good reliability among addicts in research situations.

The third limitation of the study was the operational definition of "alcohol abuse." Clients were asked two questions: (1) "Have you ever had a drink?" and (2) "Have you ever been drunk?" Respondents who answered "yes" to both of the questions were considered alcohol abusers for initial screening purposes. As later evidence indicated the very high quantities of alcohol actually consumed by those who had passed this initial screening, it was obvious that this definition of alcohol abuse was inadequate. In fact, actual alcohol consumption was so great, both 3 months prior to interview and in lifetime prevalence, that this error appeared to be negated. Although originally contemplated, it became infeasible to then develop typologies based on substance abuse because of the manner in which alcohol abusers had been labeled.

Despite the limitations, the NDACP represents a significant and as yet unique exploration of multiple substance abuse. In its favor, the population investigated was large and geographically diverse. All racial groups were represented (table 3), and the percentages of men and women were comparable to many other studies (table 4).

When the sex and race distributions and the mean age of the NDACP study population were compared to similar variables in the population served by the Alcoholism Treatment Center Management System (ATCMS) of NIAA, now called the National Alcoholism Program Information System (NAPIS) in the population sampled by

TABLE 3.—Demographic characteristics of NDACP data base

Sex		Age	Race			Education
M	F	X S.D.	White	Black	Other	Number years S.D.
1,199 (78.1)	337 (22.0)	30.6 (11.87)	907 (64.4)	488 (31.8)	57 (3.7)	10.3 (2.9)

Ethnicity					
Hispanic	English	Irish	German	Other European	Afro
249 (16.8)	115 (7.8)	203 (13.7)	119 (8.0)	233 (15.7)	455 (30.7)

Religion						
Baptist	Other Prot.	Catholic	Jewish	Muslim	None	Other
254 (16.8)	305 (20.1)	558 (36.8)	17 (1.1)	59 (3.9)	271 (17.9)	51 (3.4)

NOTE: The top number in each cell represents the raw frequency, while the number in parentheses is a raw percentage. Total percentages for each section will not sum to a grand total because of missing data.

TABLE 4.—Comparison of demographic characteristics of ATCMS,[1] CODAP,[2] and NDACP subjects[3]

	Sex		Age	Race			
	Percent male	Percent female	(Mean)	Percent white	Percent black	Percent other	Totals
ATCMS (1975)	83	17	39.5	73	15	8	36,551
CODAP (1975)	74	26	25.8	58	40	2	226,044
NDACP (1976)	78	22	30.6	64	32	4	1,544

[1] ATCMS data on race did not sum to 100 percent.

[2] Neither the ATCMS nor the CODAP questionnaires elicited information pertaining to ethnicity or religio preference in a manner comparable to the NDACP. In addition, both the CODAP and ATCMS questionn include an American Indian category. To make the data comparable to the NDACP data, these categ have been labeled "other."

[3] Clients could appear in more than one data categ[illegible].

the Client Oriented Data Acquisition Project (CODAP) in 1975, it was evident that the NDACP population fell between the ATCMS and CODAP groups in sex, age, and race (table 4). Thus it is unlikely that the NDACP investigated a demographically unrepresentative group of drug-dependent individuals.

FINDINGS

Substance Abuse Patterns: Role of Alcohol

The pivotal position of alcohol in the realm of substance abuse is illustrated by the findings that (1) most single substance abusers were involved with alcohol, and (2) the most prevalent combination of drugs used by multiple substance abusers was alcohol plus one other agent. These data reflect the generally accepted fact that, with the exception of cigarettes, alcohol is the most commonly abused psychoactive substance in our society. Specifically, alcohol abusers constituted more than 95 percent of the lifetime single substance users and nearly 82 percent of the recent single substance users in this study. For the multiple substance abuse groups, the percentages using alcohol were 97 percent and 88 percent, respectively. It is likely, then, that alcoholism will be the primary example of single substance abuse to be seen in mixed substance abuse programs.

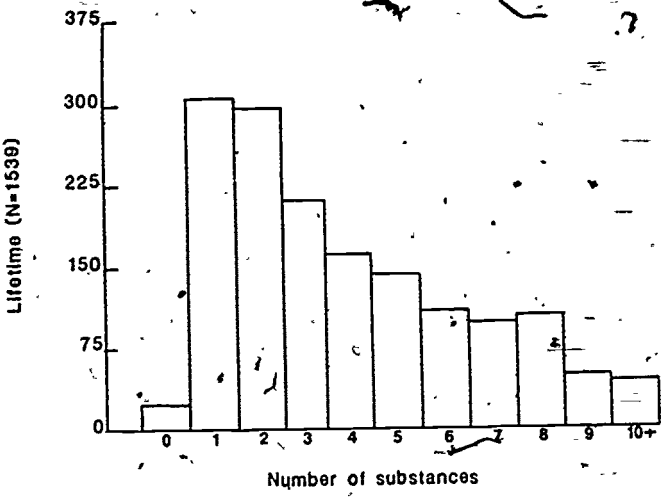
In figure 1, frequency distributions of multiple substance abusers are presented for the number of substances reported ever used during the past 3 months. Nearly 60 percent of these subjects reported using three or more drugs throughout their lives, whereas 30 percent claimed to do so in the last 3-month period. Undoubtedly the relatively long period of time covered by the lifetime usage accounts substantially for the higher rate of multiple substance involvement.

The combinations of substances abused during lifetime and the last 3-month periods are presented in tables 5 and 6.

Substance Use Combinations

Whereas 40 percent of alcohol users had used heroin at some point; 96 percent of those who had abused heroin had also abused alcohol. Similar relationships held between alcohol and such drugs as barbiturates, amphetamines, cocaine, minor tranquilizers, marijuana, and hallucinogens (table 5). With respect to use within the last 3 months, illicit drug abuse is again highly correlated with the abuse of alcohol (table 6). For example, 76 percent of those recently abusing heroin also abused alcohol during the 3 months prior to treatment; even higher percentages of the clients abusing amphetamines, barbiturates, minor tranquilizers, or marijuana in recent months were also abusing alcohol.

FIGURE 1. ***Frequency distribution of multiple substance abusers in relation to number of substances used, lifetime and during the last 3 months***



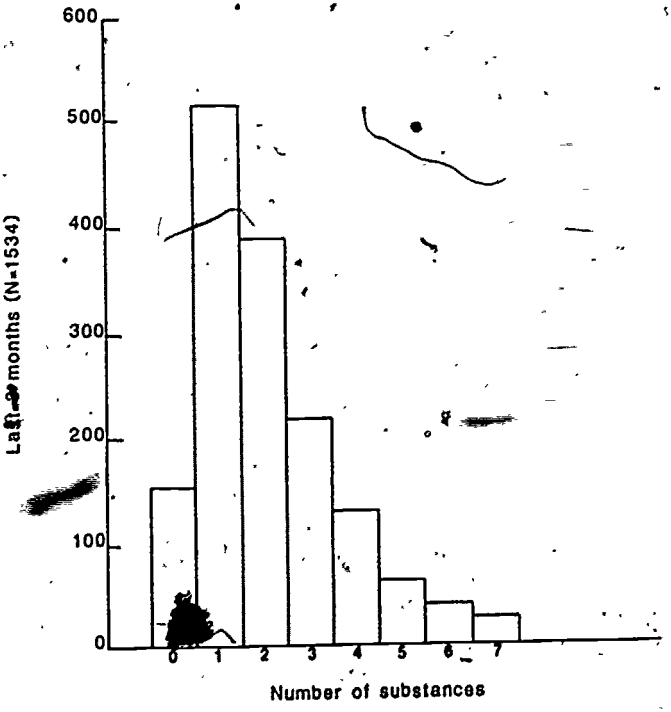


TABLE 5. Multiple substance abuse cross-tabulations of

Ever Use	ALC	HER	O.OP.	AMPH	BARB	MNR TRQ	MJ/H
Alcohol		[2]483 (40)	395 (33)	556 (47)	446 (37)	530 (44)	930 (73)
Heroin	483 (96)		276 (55)	269 (53)	254 (50)	263 (52)	413 (82)
Other opiates	395 (97)	[3]276 (68)		261 (64)	259 (63)	274 (67)	330 (81)
Amphetamines	556 (98)	269 (47)	261 (46)		303 (53)	308 (54)	484 (85)
Barbiturates	446 (97)	254 (55)	259 (56)	303 (66)		310 (67)	385 (84)
Minor tranquilizers	530 (96)	263 (48)	274 (50)	308 (56)	310 (56)		382 (69)
Marijuana/hashish	930 (99)	413 (44)	330 (35)	484 (51)	385 (41)	382 (41)	
Illegal methadone	131 (95)	132 (96)	82 (59)	64 (46)	81 (59)	82 (59)	115 (83)
Cocaine	283 (100)	221 (78)	154 (54)	165 (58)	155 (54)	148 (52)	255 (90)
Hallucinogens	273 (100)	126 (46)	140 (51)	213 (78)	195 (71)	159 (58)	266 (97)
Inhalants	152 (100)	64 (42)	71 (47)	97 (64)	88 (50)	81 (53)	141 (93)
Over-the-counter	79 (96)	34 (41)	44 (54)	49 (60)	51 (62)	52 (63)	63 (77)
Antidepressants	39 (95)	24 (59)	20 (49)	20 (49)	28 (68)	31 (76)	33 (80)
Major tranquilizers	41 (95)	22 (51)	30 (70)	22 (51)	37 (86)	31 (72)	37 (86)

[1] The total for all cells in the rows and/or columns will not sum to the row total because the same subjects appeared in several cells according to their multiple substance abuse patterns.

[2] There were 483 subjects who abused alcohol who also abused heroin at some time during their entire substance careers ("ever"). This was 40 percent of all those who had abused alcohol during the "ever" period.

the various substances ever used by the same individuals

ILG	METH	COC	HAL	INHL	OTC	ANTD	MJR TRQ	TOTALS[1]
131		285	273	152	79	39	41	1195
(11)		(24)	(23)	(13)	(7)	(3)	(3)	
132		221	126	64	34	24	22	504
(26)		(43)	(25)	(13)	(7)	(5)	(4)	
82		154	140	71	44	20	30	408
(20)		(38)	(34)	(17)	(11)	(5)	(7)	
64		165	213	97	49	20	32	570
(11)		(29)	(37)	(17)	(9)	(4)	(6)	
81		155	195	88	51	28	37	461
(18)		(34)	(42)	(19)	(11)	(6)	(8)	
82		148	159	81	52	31	31	550
(15)		(27)	(29)	(15)	(9)	(6)	(6)	
115		255	266	141	63	33	37	941
(12)		(27)	(28)	(15)	(7)	(4)	(4)	
		78	29	19	10	14	7	138
		(57)	(21)	(14)	(7)	(10)	(5)	
78			100	45	20	18	15	283
(27)			(35)	(16)	(7)	(6)	(5)	
29		100		79	29	13	24	272
(11)		(37)		(29)	(11)	(5)	(9)	
19		45	79		17	9	10	151
(13)		(30)	(52)		(11)	(6)	(7)	
10		20	29	17		10	10	82
(12)		(24)	(35)	(21)		(12)	(12)	
14		16	13	9	10		11	41
(34)		(44)	(32)	(22)	(24)		(27)	
7		15	24	23	10	11		43
(16)		(35)	(56)	(63)	(23)	(26)		

[1] There were 276 subjects who abused other opiates who also abused heroin at some time during their entire substance abuse careers ("ever"). This was 68 percent of all those who reported abusing other opiates during the "ever" period.

TABLE 6.—*Multiple substance abuse cross-tabulation of the various*

Ever Use	ALC	HER	O.OP.	AMPH	BARB	MNR TRQ	MJ/H
Alcohol		[2] 192 (25)	71 (9)	166 (22)	120 (16)	230 (30)	537 (70)
Heroin	192 (76)		44 (17)	46 (18)	44 (17)	92 (36)	144 (57)
Other opiates	71 (75)	[3] 44 (46)		22 (23)	38 (40)	60 (63)	62 (65)
Amphetamines	166 (90)	46 (25)	22 (12)		44 (24)	66 (36)	160 (86)
Barbiturates	120 (82)	44 (30)	38 (26)	44 (30)		73 (50)	100 (68)
Minor tranquilizers	230 (83)	92 (33)	60 (22)	66 (24)	73 (26)		156 (67)
Marijuana/hashish	537 (90)	144 (24)	62 (10)	160 (27)	100 (17)	156 (26)	
Illegal methadone	42 (81)	35 (67)	12 (23)	5 (9)	8 (15)	14 (27)	25 (48)
Cocaine	86 (79)	57 (52)	15 (14)	28 (26)	23 (21)	31 (28)	69 (63)
Hallucinogens	58 (88)	4 (6)	5 (8)	32 (48)	22 (33)	16 (24)	54 (82)
Inhalants	15 (89)	0 (0)	0 (0)	5 (3)	1 (6)	2 (12)	10 (59)
Over-the-counter	15 (75)	4 (20)	7 (35)	7 (35)	6 (30)	8 (40)	9 (45)
Antidepressants	6 (75)	2 (25)	0 (0)	3 (38)	2 (25)	5 (63)	3 (38)
Major tranquilizers	7 (100)	2 (29)	2 (29)	4 (57)	2 (29)	4 (57)	5 (71)

[1] The total for all cells in the rows and/or columns will not sum to the row total, because the same subject appeared in several cells according to their multiple substance abuse patterns.

[2] There were 192 subjects who abused alcohol who also reported abusing heroin in the last "3 mos." This was 25 percent of all those who reported abusing alcohol during the last "3 mos." (N=762).

substances used by the same individuals during the last 3 months[1]

ILG METH	COC	HAL	INHL	OTC	ANTD	MJR TRQ	TOTALS
42 (6)	86 (11)	58 (8)	15 (2)	15 (2)	6 (.7)	7 (.9)	762
35 (14)	57 (22)	4 (2)	0 (0)	4 (2)	2 (.8)	2 (.8)	254
12 (13)	15 (16)	5 (5)	0 (0)	7 (7)	0 (0)	2 (2)	95
5 (3)	28 (15)	32 (17)	5 (3)	7 (4)	3 (2)	4 (2)	185
8 (5)	23 (16)	22 (15)	1 (.7)	6 (4)	2 (1)	2 (1)	147
14 (5)	31 (11)	16 (6)	2 (.7)	8 (3)	5 (2)	4 (1)	276
25 (4)	69 (12)	54 (10)	10 (2)	9 (2)	3 (.5)	5 (.8)	599
	18 (35)	1 (2)	0 (0)	1 (2)	0 (0)	0 (0)	52
18 (17)		12 (10)	2 (2)	2 (2)	1 (.9)	3 (3)	109
1 (2)	12 (18)		2 (3)	0 (0)	1 (2)	2 (3)	66
0 (0)	2 (12)	2 (12)		0 (0)	0 (0)	0 (0)	17
1 (5)	2 (10)	0 (0)	0 (0)		0 (0)	0 (0)	20
0 (0)	1 (13)	1 (13)	0 (0)	0 (0)		1 (13)	8
0 (0)	3 (43)	2 (29)	0 (0)	0 (0)	1 (14)		7

[1] There were 44 subjects who abused other opiates who also reported abusing heroin in the last "3 mos." This was 46 percent of all those who reported abusing other opiates during the last "3 mos." (N=95).

Besides alcohol, the next most frequently reported substances abused by multiple substance abusers were marijuana, amphetamines, minor tranquilizers, and heroin. Examination of data from a 3-month perspective produced similar results. In instances where alcohol was a substance of abuse among multiple substance abusers, the other substance most frequently reported abused by these respondents was marijuana. Where alcohol and two substances were abused, marijuana and amphetamines were the substances most frequently reported. Where alcohol and three substances were used, the most frequently occurring combination of substances involved marijuana, heroin, and cocaine. Thus alcohol and marijuana emerge as an important combination in multiple substance abuse.

Concurrent Multiple Substance Abuse: Enhancing or Altering the Effects of the First Substance

Subjects who reported daily use of a substance for at least 1 month were asked, "What other substances did you use to boost, balance, counteract, or sustain the effects of _____?" The data in table 7 indicate that a considerable number of users of a particular drug attempted to alter the effects of that drug by the use of one or more other substances. "Inhalants" was the only substance category indicated where fewer than half of the users (36 percent) attempted to alter the effects of the drug.

Data are presented in table 8 which indicate the nature and extent of substance substitution.

The major substances used to enhance or alter the effects of primary substances are as follows:

Initial Substance	Major Altering Substances
Alcohol	Marijuana
Heroin	Cocaine and marijuana
Other opiates	Alcohol
Amphetamines	Alcohol
Barbiturates	Alcohol
Minor tranquilizers	Alcohol
Marijuana	Alcohol
Illegal methadone	Heroin and alcohol
Cocaine	Heroin
Hallucinogens	Marijuana

Patterns of Substitution for Primary Substances

In addition to the question regarding altering substances, respondents who were regular users of a substance (daily use for 1 month) were asked, "When you didn't have _____, what substance(s) did you most often use in its place?"

TABLE 7.—Number of regular users in each substance category who reported altering the effects of the substance through supplemental drug use

	ALC	HER	OO	AMP	BARB	MNR TRQ	MJ/ HSH	ILL METH	COC	HAL	INH	OTC	ANT DEP	MJR TRQ
Altered	497 (53)	320 (71)	130 (66)	234 (72)	161 (76)	149 (55)	501 (76)	97 (72)	223 (77)	205 (72)	56 (36)	37 (54)	36 (80)	21 (57)
Did not alter	434 (47)	132 (29)	66 (34)	92 (28)	51 (24)	124 (45)	154 (24)	37 (28)	67 (23)	80 (28)	101 (64)	32 (46)	9 (20)	16 (43)

[1]Numbers in parentheses are percentages of the total numbers of regular users of each column substance category who responded to the question. For example, 53 percent of the regular users of alcohol who responded to this question reported using another substance to boost, balance, counteract, or sustain the effects of alcohol.

TABLE 8.—*Number of subjects who reported altering the effects of drugs in each substance category through use of another substance or substance category*

Substances used to alter effects of initial substance	Initial substance: ALC	HER	OO	AMPH	BARB	MNR TRQ	MJ/ HSH	ILL METH	COC	HAL
Alcohol	....	87 (27.2)	48 (86.9)	119 (50.8)	91 (56.5)	69 (46.3)	381 (76.0)	30 (30.1)	57 (25.6)	82 (40.0)
Heroin	68 (17.7)	....	26 (20.0)	43 (18.4)	30 (18.6)	36 (24.2)	87 (17.4)	35 (26.1)	135 (60.5)	13 (6.3)
Other opiates	29 (5.8)	27 (6.4)	....	8 (3.4)	17 (10.6)	15 (10.1)	21 (4.2)	5 (5.1)	6 (3.6)	3 (1.5)
Amphetamines	130 (26.1)	54 (16.9)	19 (14.6)	....	15 (9.3)	11 (7.4)	116 (23.1)	4 (4.1)	8 (3.6)	30 (14.6)
Barbiturates	114 (22.9)	49 (15.3)	26 (20.0)	24 (10.2)	....	19 (12.7)	59 (11.8)	9 (9.3)	6 (3.6)	16 (6.6)
Minor tranquilizers	55 (11.1)	35 (10.9)	21 (16.1)	17 (7.3)	19 (11.8)	....	16 (3.2)	21 (21.6)	5 (2.2)	3 (1.5)
Marijuana/ hashish	304 (61.2)	113 (35.3)	34 (26.1)	85 (36.3)	53 (32.9)	20 (13.4)	....	16 (16.6)	52 (23.3)	137 (66.8)

Illegal methadone	11 (2.2)	15 (4.7)	2 (1.5)	1 (0.4)	10 (6.2)	21 (14.1)	5 (1.0)	....	3 (1.3)
Cocaine	43 (8.6)	114 (35.6)	5 (3.8)	9 (3.8)	5 (3.1)	3 (2.0)	30 (6.0)	11 (11.3)	....
Hallucinogens	36 (7.2)	9 (2.8)	0 (0.0)	19 (8.1)	7 (4.3)	1 (0.7)	63 (12.6)	0 (0.0)	1 (0.4)
Total number who altered	497	320	130	234	161	149	501	97	223

The upper number in each cell indicates the number of people who reported boosting, balancing, counteracting, or sustaining the use of the substance category with the row substance category (e.g., 87 subjects reported using alcohol to alter the effects of heroin).

The number in parentheses in each cell is the percentage of the total number of regular users of that column substance category who reporte any other substance to alter its effects (e.g., the 87 subjects who reported using alcohol to alter the effects of heroin are 27.2 percent of regular heroin users who altered heroin's effects).

The column percentages will not sum to 100, because there is overlap between categories (e.g., the subject might alter the effects of hero alcohol, barbiturates, and marijuana). The raw numbers will not sum to the total shown at the bottom of each column, for the same reason.

Tables 9 and 10 present data on primary substances and their substitutes.

The following are used most frequently as a substitute for the initial substance (from table 10):

Initial Substance	Major Substitute
Alcohol	Marijuana
Heroin	Other opiates
Other opiates	Heroin
Amphetamines	Marijuana
Barbiturates	Minor tranquilizers, marijuana, alcohol
Minor tranquilizers	Alcohol
Marijuana	Alcohol
Illegal methadone	Heroin
Cocaine	Heroin
Hallucinogens	Marijuana

MEDICAL AND PSYCHOSOCIAL CONSEQUENCES ASSOCIATED WITH SUBSTANCE USE

Included in the data acquisition form was a detailed series of items pertaining to possible medical and psychosocial consequences of drug (67 items) or alcohol (65 items) use. Some of these are--

(1) Psychological: confusion, unusual thoughts, loss of ability to think clearly, anxiety, nervousness, difficulty sleeping, psychological dependence;

(2) Medical: shakes or tremors, loss of consciousness, withdrawal symptoms, overdose, detoxification, emergency room treatment, methadone maintenance;

(3) Social dysfunction: suspended from school, rejected for military service, drug use during work or work-related hours, job loss;

(4) Illegal activity: bookings, convictions, liquor law violations, drunken driving, drunkenness; and

(5) Treatment necessitated by substance abuse: previous treatment for emotional problems, being involved in detoxification.

The association between substance use and these consequences was examined during subjects' lifetimes (table 11).

Consequences related to alcohol use were experienced by 92 percent of 1,523 subjects and drug-related consequences by 91 percent of 1,536 subjects for whom data were available. The mean number of alcohol consequences reported by those who

TABLE 9.—Number of regular users of each substance who reported ever using a substitute agent for that substance

	Substance categories										
	ALC	HER	OD	AMP	BARB	MNR TRQ	MJ/ HSH	ILL METH	COC	HAL	INH
Substituted	299 (31)	269 (58)	92 (48)	119 (37)	115 (48)	112 (32)	2[illegible] (44)	92 (69)	138 (48)	112 (39)	45 (29)
Did not substitute	675 (69)	189 (42)	101 (52)	205 (63)	123 (52)	163 (68)	372 (56)	41 (31)	151 (52)	174 (61)	109 (71)

NOTE: Numbers in parentheses are percentages of the total number of regular users of each column substance category who responded to the question. For example, 31 percent of the regular users of alcohol who responded to the question reported ever substituting another substance for alcohol; 69 percent reported not substituting.

TABLE 10.—*Numbers of subjects reporting substituting one substance for another unavailable substance*

Other substances used as substitutes	Initial substance									
	ALC	HER	OO	AMPH	BARB	MNR TRQ	MJ/ HSH	ILL METH	COC	HAL
Alcohol	....	56 (20.8)	18 (19.6)	32 (26.9)	23 (20.0)	46 (41.1)	230 (78.2)	12 (13.0)	34 (24.6)	37 (33.0)
Heroin	42 (14.0)	....	41 (44.6)	21 (17.6)	16 (13.9)	14 (12.5)	18 (6.1)	70 (76.1)	66 (47.8)	8 (7.1)
Other opiates	16 (5.3)	79 (29.4)	....	6 (5.0)	7 (6.1)	6 (5.3)	11 (3.7)	13 (14.1)	5 (3.6)	1 (0.9)
Amphetamines	30 (10.0)	24 (8.9)	2 (2.2)	....	4 (3.5)	2 (1.8)	18 (6.1)	0 (0.0)	14 (9.1)	16 (14.3)
Barbiturates	57 (19.1)	45 (16.7)	16 (17.4)	11 (9.2)	....	32 (28.6)	38 (13.0)	3 (3.3)	7 (5.1)	10 (8.9)
Minor tranquilizers	20 (6.7)	27 (10.0)	6 (6.5)	5 (4.2)	26 (22.8)	....	8 (2.7)	4 (4.3)	0 (0.0)	2 (1.8)
Marijuana/ hashish	165 (55.2)	24 (8.9)	18 (19.6)	38 (31.9)	24 (20.9)	17 (15.2)	....	4 (4.3)	36 (26.1)	68 (60.7)

Illegal methadone	8 (2.7)	54 (20.0)	5 (5.4)	0 (0.0)	2 (1.7)	2 (1.8)	1 (0.3)	....	2 (1.4)	1 (0.9)
Cocaine	11 (3.7)	14 (5.2)	3 (3.3)	9 (7.6)	1 (0.9)	2 (1.8)	3 (1.0)	3 (3.3)	....	3 (2.7)
Hallucinogens	10 (3.3)	0 (0.0)	1 (1.1)	19 (16.0)	0 (0.0)	1 (0.9)	12 (4.1)	0 (0.0)	3 (2.2)	....
Total number who substituted	299	269	92	119	115	112	294	92	138	112

The upper number in each cell indicates the number of people who reported substituting for the column substance category with the row substance category (e.g., 56 subjects reported using alcohol as a substitute for heroin).

The number in parentheses in each cell is the percentage of the total number of regular users of that column substance category who reported using any substance as a substitute for it (e.g., the 56 subjects who substituted alcohol for heroin are 20.8 percent of 269 who reported substituting anything at all for heroin).

The column percentages will not sum to 100, because there is overlap among the categories (i.e., the subject could have substituted alcohol, barbiturates, and marijuana for heroin). The raw numbers will not sum to the total shown at the bottom of each column for the same reason.

TABLE 11.—Mean lifetime number of alcohol and drug consequences in relation to patterns of substance use, demographic characteristics, and number and class of substance used

	Mean number of alcohol consequences	N	Mean number of drug consequences	N
Age (years):				
17 or less	5.4	246	6.7	246
18 to 24	9.5	363	11.5	363
25 to 29	10.7	286	11.9	285
30 to 39	12.0	288	8.7	288
40 or more	12.0	313	4.8	313
Sex:				
Male	10.6	1,199	8.9	1,199
Female	7.4	337	8.2	337
Race:				
White	N.S.	987	8.4	987
Black	N.S.	488	9.7	488
Other	N.S.	57	6.6	57
Substance:				
Heroin	9.4	483	15.5	559
Other opiates	11.7	378	14.8	413
Illegal methadone	8.5	132	17.1	139
Amphetamines	10.7	562	13.2	577
Cocaine	9.7	287	14.7	296
Barbiturates	11.0	448	13.9	463
Minor tranquilizers	14.5	533	12.0	555
Marijuana	9.3	930	11.3	954
Hallucinogens	10.8	282	14.0	289
Inhalants	12.7	155	12.9	159
Over-the-counter drugs	11.2	80	12.3	83
Major tranquilizers	15.1	41	15.3	43
Antidepressants	11.5	40	14.0	42
Number of substances abused:				
1	11.0	268	2.2	307
2	8.7	266	4.2	301
3	9.8	198	7.4	226
4	9.4	151	9.9	161
5	8.6	126	11.8	142
6	9.0	91	14.8	107
7	11.8	96	15.8	102
8	12.3	95	16.4	104
9	11.9	39	17.1	46
10	12.0	35	18.3	31
11 and more	--	--	20.7	7

claimed any was 9.9; the median was 8; and the mode, 2. For drug-related consequences, the comparable mean was 8.8; the median, 6; and the mode, 1. Thus, nearly all subjects experience at least one drug-related and one alcohol-related sequel. Based on these figures, the distribution shows considerable positive skew, with a few subjects having large numbers of consequences.

As might be expected, amount of substance consumed was related to number of consequences reported. In addition, certain demographic factors bore a relationship to this area. For example, age, male sex, and single substance alcohol use were found to be directly related to the mean number of alcohol consequences experienced. However, the intermediary correlate in all three cases was actual consumption of alcohol. Single substance alcohol users tended to drink more alcohol than multiple substance users whose repertoire included alcohol, accounting for a correlation between single substance alcohol use and consequences experienced. It is likely that longer drinking histories, with associated chronic toxicity, were accounted for by the age factor. The significance of sex, too, may be accounted for by the predominant sex-linked drinking practices, since male subjects were found to consume significantly more alcohol than women.

Age (18 to 30 years), years of education, being black, and number of drugs used were associated with higher mean numbers of drug-related consequences. Years of education, however, is partially linked to age, making this datum difficult to interpret. A markedly lower level of drug consequences observed in subjects over age 30 may be related to the higher prevalence of single substance alcohol use (i.e., no drug use) among members of the older age group.

With respect to multiple drug use, it can be seen in table 11 that on the average, for each additional drug abused, nearly two additional drug-related consequences were reported.

MEDICAL AND PSYCHOSOCIAL CONCOMITANTS OF SUBSTANCE ABUSE PATTERNS

The medical and psychosocial backgrounds of the entire sample of subjects were explored with the aim of correlating these variables with patterns of substance use. The background areas included family history; education, employment, criminality; family life as adults; social network; previous treatment; and use of coffee, tea, and tobacco. These were analyzed for the total population, although no control or comparison groups were used.

In general, analysis of the data revealed a population whose members had experienced many medical and psychosocial problems.

Family History

The family problems noted in the data analysis tended to begin in early childhood, with 76 percent of subjects reporting at least one family problem while growing up. Divorces occurred during childhood in the families of 40 percent of the respondents. The median age of subjects at time of divorce was 7.8 years. Drinking problems were reported in the families of 35 percent of the subjects, and 12 percent reported drug problems, usually involving a sibling.

Approximately 22 percent of the respondents reported serious or chronic illness in the family, involving the mother (38 percent) more frequently than the father (25 percent). Deaths, primarily of fathers, occurred in 28 percent of the subjects' families, suggesting very high levels of early object loss.

In addition to object loss and disruption of homelife, violence was experienced by a large proportion of subjects. For example, severe beatings, usually administered by fathers, were reportedly common during childhood, involving nearly a fifth of the subjects. In 40 percent of these cases the person administering the beating was reported to be under the influence of alcohol. Sexual abuse was reported by 3 percent of the subjects. Usually the abusing individual was a close family member, such as an uncle, father, stepfather, or brother. In one-third of these cases, the abuser was reported to have been drinking heavily.

Criminal activity among family members was reported by 18 percent of the respondents. Most commonly the family member criminally involved was a brother.

The significance of the amount and type of problems experienced by this population is difficult to assess without controls for race, ethnicity, and socioeconomic status. It is clear that during childhood the substance abusers in this study were subjected to high levels of stressful family problems that could have predisposed the development of future psychopathology. However, it is not certain whether the amount and types of problems experienced by this group differs from that of sociodemographically comparable groups in which high rates of drug dependence have not occurred.

Education

In general, the respondents reported unstable educational backgrounds, which may have contributed in later years to employment difficulties. The educational factors assessed included highest grade completed, attendance record, suspensions, and expulsions. The majority (55 percent) of the subjects old enough to have completed high school had failed to do so, 30 percent of the subjects had poor attendance records, and 48 percent were suspended or expelled from school one or more times. However, since controls for age and other demographic variables were not employed, definitive conclusions cannot be drawn.

Employment

More than 40 percent of the subjects began first full-time jobs before the age of 18. The first job tended to be an unskilled one and, for most, the level of usual employment was also unskilled. Unemployment rates were reportedly lower than among many other addict groups. During the 1-year period 1974-75, 28 percent of the subjects were unemployed, and 14 percent reported no earned income during the 3 months preceding the study. Those subjects with a history of multiple substance abuse reported either less income or higher income (bimodal distribution) during the recent 3-month period prior to interview than did those single substance users who abused only alcohol.

Criminality

More than 72 percent of the respondents reported having been arrested, 59 percent convicted, and 52 percent incarcerated. Of those ever convicted, 36 percent were convicted before the age of 18. Thus the level of criminal activity was high among members of this drug-dependent group.

Men, blacks, and older respondents reported more arrests than the other subgroups. The greater numbers of arrests in older subjects suggest that criminal behavior patterns constitute an ongoing way of life for at least some addicts. Multiple, more than single, substance abuse was associated with increased criminality. Although the number of substances abused was correlated with number of crimes committed, single substance abusers tended to report more substance-related crimes (such as driving while intoxicated) than multiple substance abusers, whereas multiple substance abusers reported more crimes unrelated to substance use (e.g., burglary).

Family Life as Adults

As adults, the subjects experienced stressful, problem-filled family or personal lives, much as they did as children. About half the respondents had never married. Those who did marry or take a mate reported many problems, with substance use indicated as a major contributing factor. More than half (53 percent) of the mated respondents reported a substance abuse problem with their mate, in two-thirds of these cases, alcohol was cited as the substance abused.

Other major problems reported were sexual difficulties (18 percent), criminal activity (30 percent), not getting along with friends (37 percent), and difficulties with children (22 percent). Again it was claimed that substance abuse contributed to difficulties in at least half of all cases.

Social Network

Each respondent was asked to list three persons on whom he or she could depend for help when needed. Blood relatives,

particularly mothers (28 percent), were mentioned most often. Only 18 percent of those with a spouse or children identified these relations as part of the social network. Ten percent of the respondents listed three other substance abusers. Individuals in the study population seemed to suffer from a lack of meaningful family relationships, which most likely stemmed from, but also served to intensify, the high level of life distress experienced by members of this group. Lack of stable, warm interpersonal relationships has been found in addicts by others (Gilbert and Lombardi 1967).

Previous Treatment

About one-third of the respondents reported ever having received treatment for an emotional problem or a substance use problem prior to NDACP admission. Half of the respondents had been detoxified at least once, most frequently from alcohol or heroin. Prior treatment for substance use problems was mentioned by 39 percent of the respondents, with the therapeutic community modality mentioned most often. The duration of prior treatment was generally less than a year. Attempted suicide was reported by 18 percent of the respondents, perhaps reflecting both chaotic internal states and the poor impulse control which is characteristic of individuals with serious drug involvement.

Use of Coffee, Tea, and Tobacco

Analysis of the data pertaining to the use of coffee, tea, and tobacco suggested that substance abuse was negatively related to consumption of caffeinated beverages, but positively related to smoking. This appeared to be particularly true for the single (mainly alcohol) substance users. Others have also found that tobacco smoking correlates with drug and alcohol use (Seltzer et al. 1974; Lavenhar et al. 1972; Block 1975), emphasizing the importance of including habitual smoking in any consideration of the addictive disorders.

OVERVIEW

The more salient findings in this chapter address--(1) the patterns of use of substance categories, including alteration and substitution patterns, based on lifetime and recent use; (2) negative psychobiosocial consequences associated with drug abuse and alcohol abuse; and (3) psychobiosocial correlates of drug/ alcohol abuse. Ten demonstration treatment projects participated in the study, with a total sample size of 1,544. The 330-item Data Acquisition Form (DAF) was used. The DAF items pertaining to substance use made it possible to obtain extensive and detailed histories of drug and alcohol use both throughout the lifetime of the subject and during the 3 months prior to interview.

The main limitation of the study appears to be the lack of representativeness of the sample composing the study. Randomization

procedures were not used. Nevertheless the NDACP represents a significant and as yet unique exploration of multiple substance abuse, with 10 programs treating clients in a combined modality, a large data base, geographically, racially, and sexually diverse.

The following are the major findings of the study:

(1) Alcohol abuse accounted for virtually all of those classified as single substance abusers (95 percent) throughout their substance abuse careers. Those who abused only alcohol were older (40 years) than those who had been multiple substance abusers (26 years). Exclusive marijuana/hashish abusers were younger (49 percent were 17 years old or younger). Exclusive heroin abusers fell in between these two groups (55 percent were 29 years old or younger).

(2) Except in the inhalant abuse category, the majority of subjects in all other substance abuse categories reported using one or more other substances to "boost, balance, counteract, or sustain" the effects of substances already taken. More than 75 percent of the regular users of barbiturates, marijuana, cocaine, and antidepressants reported altering the effects of these categories. The two substances most commonly used to alter the effects of other substances were alcohol and marijuana.

(3) The two substance categories within which substitution of other substances occurred most frequently were heroin and illegal methadone; the two categories in which substitutions occurred least frequently were alcohol and inhalants. Alcohol and marijuana were reported most frequently as substitute substances in half of the individual substance categories. For most of the other categories, a pharmacologically related substitute was likely to be reported.

(4) The frequency of drug abuse increased from an average of nearly once a day at the onset of drug intake to nearly twice a day during the 3 months just prior to last treatment.

(5) The mean number of alcohol-related consequences of all subjects was 9.9. These consequences pertained to five domains, including psychological impact, medical complications, treatment necessitated by substance abuse, social dysfunctions, and illegal activities. Alcohol-related psychobiosocial consequences were found to be significantly related to age, sex, and exclusive abuse of alcohol. The volume of alcohol consumed was, in general, positively related to the number of alcohol consequences, although a few exceptions were observed.

(6) The mean number of drug-related consequences for all subjects was 8.8. These consequences related to the same domains reported for alcohol-related consequences. Drug consequences were found to be significantly related to race, age, and substance abuse patterns. There was also a direct

positive relationship between the number of substances abused and the number of drug-related consequences reported.

PROGRAM DESCRIPTIONS

The 10 programs participating in the NDACP project and the distribution of clients is shown in table 12. For description of the Eagleville programs, see chapters 4 and 5.

Addiction Research and Treatment Corp.

The Addiction Research and Treatment Corp. (ARTC) is a comprehensive methadone maintenance treatment program which has served the hardcore heroin addict of the New York City urban ghetto for the past 8 years. The average patient served by ARTC is 32 years old, black, male, and has been with the program for approximately 20 months. Currently, ARTC is treating approximately 1,400 patients.

ARTC offers a full multimodality range of treatment services which include the following: medical, mental health, job development, educational, legal, and social services, and methadone maintenance. All of these services are offered in a coordinated fashion. Patients are assigned to a treatment team which consists of representatives from each service department. This treatment team reviews the treatment needs of each patient individually and determines a treatment plan for him or her. This method is referred to as the interdisciplinary team approach.

The experience of ARTC is that polydrug abuse is a widespread phenomenon in their patient population. In a randomly selected sample of 140 patients, ARTC demonstrated the side of the polydrug use problem and the prevalence of alcohol use in combination with other drugs. All but three of the 140 patients reported multiple substance abuse. In fact, the mean number of substances abused was 4.9. The most frequent patterns were--

(1) Alcohol, heroin, and methadone

(2) Alcohol, marijuana, and methadone

(3) Alcohol, cocaine, heroin, and methadone

For the typical ARTC patient, alcohol was the first drug used, primarily as a social drug. Secondly, alcohol tended to be replaced as a social drug by heroin. Many of these patients who entered into methadone maintenance treatment ceased their heroin use but began to use alcohol again. Thus, ARTC feels that both alcohol and drug use problems need to be treated in most of the patients.

TABLE 12.—Distribution of NDACP clients according to program

	Number of clients included in NDACP
Addiction Research and Treatment Corp., Brooklyn, N.Y.	140
Areawide Drug/Alcohol Research Project, Denver, Colo.	83
Drug Projects Resource Center of the North Charles Foundation, Cambridge, Mass.	102
Eagleville Hospital and Rehabilitation Center, Eagleville, Pa.	547
Hennepin County Drug/Alcohol Project, Minneapolis, Minn.	196
Professional Youth Services Perth Amboy, N.J.	81
Spanish Psychosocial Research Center for Mixed Addictions, Miami, Fla.	200
Substance Abuse Project, Collier County Mental Health Center, Naples, Fla.	77
Thee Door Substance Abuse Program, Orlando, Fla.	90
Rubicon,[1] Richmond, Va.	28
	N=1,544

[1]Administratively withdrawn from the NDACP.

Hennepin County Drug/Alcohol Research Project

The Hennepin County Drug/Alcohol Research Project is a private adolescent and young adult detoxification and drug-treatment unit. It is housed in St. Mary's Hospital in Minneapolis, Minnesota. The program has three treatment phases: (1) detoxification, intervention, evaluation, and referral; (2) inpatient chemical dependency treatment; and (3) aftercare services. Families are involved in treatment. Other services include yoga, encounter groups, occupational therapy, schoolwork with tutors, A.A. meetings, and day care and aftercare.

A followup study of 126 adolescents and young adults was conducted. The majority of these subjects were multiple substance abusers who reported abusing mostly cannabis, hallucinogens, alcohol, and amphetamines. About 17 percent had abused alcohol. Single substance abuse was reported by only six of the subjects.

Approximatley 59 percent of the sample completed treatment, and the rest signed out against medical advice, "split," were referred elsewhere, or were discharged because of undesirable behavior. It was found that males with a prior record of criminal justice system involvement were much more prone to drop out of treatment than were males without any involvement with the criminal justice system.

Six-month followup results were available on 94 percent of the sample. Sixty-seven percent of the patients who had entered the community following completion of the detoxification phase had subsequently been placed in a drug/alcohol-related confinement site. Fifty-two percent of the patients who left St. Mary's without completing treatment were similarly found to have been placed in such a site. Only 20 percent of those who completed treatment found themselves in similar circumstances.

Although the sample size at the 1-year followup was smaller, the results are similar. Eighty-three percent of those who left after detoxification and 68 percent who left sometime after that period received subsequent treatment confinement for drug- or alcohol-related reasons. The best results at the 12 months' followup were achieved by patients who had completed treatment and entered the community. Some 46 percent of these patients had to be placed in a drug/alcohol-treatment facility.

The 6- and 12-month followup studies demonstrate a better adjustment among patients completing the combined treatment program in contrast to those entering the community immediately following detoxification or those who either "split," were expelled, or left against medical advice.

Drug Problems Resource Center of the North Charles Foundation

The Drug Problems Resource Center, located in Cambridge, Massachusetts, was a multimodality program which provided the

following services: patient evaluation and screening, inpatient treatment, detoxification services, aftercare, outpatient services, social services, and outreach. The goals of the multiple substance abuse demonstration program were to achieve the following:

(1) Define the characteristics of the multiple substance abusing population.

(2) Assess the need for special treatment programs for multiple substance abusers.

(3) Compare two different treatment approaches for multiple substance abusers: thresholds and multimodality.

The multimodality treatment program was a comprehensive treatment method which emphasized individual and group counseling in a modified psychodynamically oriented approach. The thresholds program was more cognitively oriented and based on the premise that drug involvement or abuse correlates with a deficit in decision-making abilities. Volunteers recruited from the community were used as counselors for this program.

An instrument called the Psychiatric Status Schedule (PSS) was used to analyze the effectiveness of the two programs. A variety of symptoms and function states were studies, including physical health, body image, mood and affect states, interpersonal relations, thought processes, sleep disturbance, medication, drug and alcohol use, illegal acts, travel, management of money, and role-functions of wage earner and housekeeper. The PSS was administered at both intake and discharge. Preliminary analysis of variance results indicated that patients did improve but no significant differences were found between the two programs. It was also determined that neither treatment modality was successful in maintaining clients in treatment on an outpatient basis.

Other conclusions drawn by the center were:

(1) There is a continuing need to provide inpatient care for multiple substance users.

(2) The restlessness and mobility of the groups indicated that hospital stays should be sufficiently long to insure adequate detoxification and readjustment.

(3) Psychotropic medication should be used in psychotic, serious depressive, or bipolar affective cases but not be used for sleep.

(4) It was more difficult for staff to adjust to combined treatment than it was for patients. The key to staff preparation was training.

Areawide Drug and Alcohol Research Project

The Areawide Drug and Alcohol Research Project (ADARP) is a cooperative effort of the Colorado Department of Health, Fort Logan Mental Health Center, and the Arapahoe Mental Health Center. The treatment modalities offered include three intensive care treatment settings:

(1) A residential-based support system or short-term therapeutic community.

(2) An intermediate, nonresidential support system or combination of day care and outpatient programs.

(3) A community-based support system or brokerage and prevention-oriented short-term intervention program.

All patients participate in a two-phase program in each of the intensive care treatment settings. They must undergo a short-term diagnostic period which varies between 1 week and 1 month. And they must undergo a more intensive treatment period which lasts from 1 to 3 months. Patients in the community-based program are also offered continuing care and followup services.

ADARP admits alcoholics, drug addicts, and those who abuse both substances. The program has found that the typical multiple substance abuser exhibits a higher degree of psychopathology and social dysfunction than the typical single substance abuser and that present community resources are inadequate and ineffective in dealing with this target population.

Part of ADARP's goal is to evaluate the effectiveness of combined treatment. Followup data have not yet been analyzed. However, preliminary results are available on the Client Evaluation Scale which is completed by both staff and clients and which measures personality and areas of life-space dysfunction (alcohol and drug use, relationship with others, etc.) Overall, it was found that clients admitted to residential treatment were rated as having more severe problems. In comparing entry with discharge ratings there was a slight decrease in staff ratings of problem severity.

The ADARP feels that the combined treatment of drug abusers and alcoholics is feasible. It was determined that the key to operating a combined treatment system was to have a flexible multidisciplined staff and a supportive administrative structure.

The Adolescent Alcohol and Drug Abuse and Demonstration Project

The Adolescent Alcohol and Drug Abuse and Demonstration Project, located in Trenton, New Jersey, was involved in the development, establishment, and evaluation of Professional Youth Services (PYS)--a coordinated service delivery model for the treatment of adolescent alcohol and/or drug users and abusers. The project was guided by the following three hypotheses:

(1) Alcohol and drug usage among adolescents (12 to 18 years old) is differentially related to a complex array of factors, including demographic characteristics, psychosocial functioning, and intrapersonal and interpersonal dynamics.

(2) Proper diagnosis and appropriate treatment planning to serve substance abusers is based upon an accurate and adequate assessment of the factors (outlined above), as well as the client's history of alcohol and drug use.

(3) That a single coordinated management and professional service delivery system can provide effective intervention, treatment, and aftercare services for adolescents with a history of using and abusing alcohol and/or drugs.

PYS acts as a central screening and referral center. After their needs are diagnosed, clients are sent to one of three agencies whose services have been contracted:

Chelsea School, a therapeutic school which focuses on education as part of a therapeutic process.

Woodbridge Action for Youth, a learning and vocational school which offers a therapeutic milieu in both drug and outpatient settings.

Youth Co-Op Day Program and Outpatient Services, a drug and alcohol treatment center designed to meet the special needs of adolescents.

Most of the clients referred to treatment were male, white adolescents.

This demonstration project included two research components. An evaluation design was planned, utilizing scores derived from changes in the client from entry to followup. Multiple discriminant analysis was used to choose the best predictors of change. The second component, an epidemiology study of drug and alcohol use in the area, was conducted through the use of data obtained from local junior and senior high schools. This work included an identification of multiple substance use patterns and a determination of significant indicator variables and profiles for adolescent alcohol/drug users and abusers.

The following conclusions emerged from the project's experience:

(1) Combined treatment is a necessity, not an option, for adolescents. Few adolescents are single substance abusers and their problems are not directly related to specific substances.

(2) Drug and alcohol treatment agencies need to maintain linkages with other agencies and institutions to treat the many problems which these adolescents present.

(3) Certain minimum requirements (adequate data bases, thorough assessment of client needs, individualized treatment plans, progress notes, monitoring and audit processes for each client, and followup and aftercare services) need to be maintained.

(4) Treatment programs need to make special efforts to motivate clients to enter and stay in treatment. The involvement of friends and family is often an important part of the treatment process.

Substance Abuse Human Ecology Project,
Collier County (Fla.) Mental Health Clinic, Inc.

The Substance Abuse Human Ecology Project, located in Naples, Florida, operates two treatment centers, one primarily for alcoholics and the other for multiple substance abusers. Most of the patients were white, male, older (mean age 40 years) laborers and farmworkers. There were also Hispanics and some American Indians in the treatment population. It was found that most of the older persons were alcoholics, while multiple substance abuse patterns were observed in the younger clients. Treatment in the two centers was of the "therapeutic community" type and day-care treatment was also available.

A followup study was conducted of 123 patients admitted to 1 of the 2 centers. In an analysis of the data, clients were compared on the following measures:

(1) Symptom checklist.

(2) Brief symptom inventory.

(3) Global functioning of patients as rated by the chief therapist at each residential center.

Results showed that using the various measures of symptomatology, the number of symptoms declined considerably and the level of distress experienced by clients at termination from residential treatment was less than it had been at entry. In terms of global functioning, clients on the average changed from "major impairment" in several areas such as work, family relations, judgment, etc., at entry to "some difficulty" or "mild symptoms" at discharge.

Overall, the alcoholics showed more improvement than multiple substance abusers. While clients at both treatment facilities reported being satisfied with the treatment program, those at the multiple abuser facility reported significantly less satisfaction. Overall, however, it was felt that combined treatment was neither more nor less successful than substance-specific treatment.

Spanish Psychosocial Research Center for Mixed Addictions

The Spanish Psychosocial Research Center for Mixed Addictions (SPRCMA) utilizes an ecological family systems therapy model to treat Latin drug and alcohol abusers in Miami, Florida. SPRCMA believes that the model is most appropriate to the population served as is outlined in the following hypotheses:

(1) With a Spanish-speaking population, treatment that focuses on family interventions will be more effective in bringing about desired change than treatment focusing on the individual.

(2) In working with Spanish-speaking clients above 16 years of age, family therapy approaches will be most effective with least acculturated clients. Individual therapy approaches will be most effective with the more highly acculturated clients.

(3) With a Spanish-speaking population, treatment that includes direct ecological interventions (discussed below) is more effective than intramural approaches (discussed below) alone.

(4) The ecological conditions will be most effective with the least acculturated clients. Intramural conditions will be most effective with the more highly acculturated clients. The relationship between these variables, however, is moderated by socioeconomic class, and the degree to which the life context is Latin or Anglo.

(5) There is a relationship between the choice of presenting symptom and the level of acculturation. Less acculturated substance-abusing clients will present for treatment complaining of general psychosocial problems and psychiatric symptoms, whereas more acculturated clients will present substance abuse as a problem.

(6) There is a relationship between the level of acculturation of Cuban immigrants and the kind of drugs abused, with acculturated Cubans abusing illegal drugs and unacculturated Cubans abusing licit drugs.

There are four treatment conditions. ecological family systems therapy (the experimental condition) and intramural family systems therapy, ecological systems individual therapy, and intramural individual therapy (these latter three are the control conditions). In the intramural conditions, therapeutic interventions are limited to the client in treatment, which may be an individual or a family according to the condition. In the ecological conditions, the counselor can and should have as many therapeutic contacts with different aspects of the ecology as possible. An evaluation study is being completed by the program but results are not yet available.

Thee Door Substance Abuse Project

Thee Door Substance Abuse Project, located in Orlando, Florida, conducted a field study in the area of combined treatment of multiple substance abusers among rural and migrant populations with special emphasis on seasonal farmworkers. An outpatient treatment center was established in each of two similar communities. One treatment center was staffed by college-trained conselors while the other was operated by paraprofessional recovered staff. Centers provided a variety of services which included detoxification, medical services, psychological testing, individual counseling, group and family counseling, and referral and followup services.

The project was guided by three major questions:

(1) Were there any systematic differences in the way the centers developed and operated?

(2) Were either of the two centers more effective in treating substance abusers?

(3) Were there treatment outcome differences by type of substance abuser?

In answer to the first question, differences were noted in operation of the centers. The paraprofessionals more often recruited their staff directly from the streets, labor camps, bars, etc. The professionals, on the other hand, more often gave formal presentations to churches, civic clubs, etc. Professional staff included fewer blacks, although interestingly they attracted more farmworkers. While both centers equally attracted alcoholics, the paraprofessional center attracted more drug-only users while the professional center attracted more multiple substance abusers.

In examining treatment outcomes by centers the following findings emerged:

(1) Illicit drugs were used very little and what were used were used about the same amount in both treatment centers. Marijuana was the exception. It was used more often by clients of the paraprofessional center.

(2) Alcohol was used more heavily by clients in treatment at the paraprofessional center.

(3) There were no differences between the two centers in arrest of clients while in treatment.

(4) The paraprofessional staff reported a larger number of clients as employed and in school.

(5) The professional staff tended to rate clients higher on the Global Assessment Index, while the paraprofessionals' rating had more variability.

(6) The professional staff indicated that they observed more physical improvement among clients, while the paraprofessionals saw more attitudinal improvements.

(7) There were no differences in the number of appointments missed between the two centers.

In looking at treatment outcome by type of users, the data show that clients designated as having problems with alcohol only and those designated as drug/alcohol at intake were very similar in outcomes observed during treatment. When compared with drug-only abusers, the alcohol and drug/alcohol clients used less marijuana, had more arrests, worked full time more often, showed similar starting points and gains on the Global Assessment Index, showed a similar gain on the Goal Attainment Scaling, and had similar patterns of missed appointments.

The two areas where the drug/alcohol clients more closely resembled the drug-only clients were in the amount of alcohol consumed during treatment and in counselor's opinion of client's attitude toward treatment. The alcohol-only clients drank more than four times as much as either the drug or drug/alcohol clients.

While there were differences in outcome, it does not appear that one type of client was helped significantly more or significantly less than any other type of client. Thus, overall, it was felt that there are no disadvantages to the combined approach, while there may be some fiscal advantages.

CONCLUSION

The data presented in this chapter provide documentation of the considerable degree of use of multiple substances usage in both concurrent and alternating forms, and as regards substitution and altering the effects of the primary drug.

Given that one purpose of the NDACP project was to encourage programs to attract multiple substance users, it would appear that this phase of the project was successful.

The findings of this study, along with previous findings by other researchers, would lend credence to the existence of the "multiple substance abuse" phenomenon. It also points to the very high percentage of single substance abusers who are alcohol abusers. The data that is available from both NIDA (CODAP) and NIAAA (NAPIS) may not fully establish the extent of mixed drug and alcohol usage.

Implications for treatment are many. Program should carefully construct the clients full substance history to gain better understanding of the frequency and types of drugs being used. Since there is a strong relationship between the medical and psychosocial consequences and the number of substances used by individuals,

knowledge by treatment personnel of the clients' substance history is likely to be associated with other problems that treatment agencies must deal with directly or refer out. Persons who have lengthy and varied substance histories appear to present more severe psychopathological profiles than those individuals with narrower substance histories. Psychological and psychiatric screening, evaluation, and treatment may be appropriate resources to consider when dealing with a heavy multiple user.

At this point in time, there is insufficient evidence regarding what types of treatment interventions are most effective. As will be presented in a later chapter (chapter 4), attempts have been made to study separate and combined treatment approaches with different types of substance abusers. Drug use patterns, psychosocial characteristics, and demographic patterns are all variables that must be further considered in attempting to plan any consistent treatment protocol.

CHAPTER IV

Evaluation of Eagleville's Residential Combined Treatment Program

Lewis Aumack, Ph.D.

INTRODUCTION

This chapter presents the results of a 3-year demonstration program that was designed to compare the effectiveness of two treatment approaches for substance abusers. In one approach, called "combined treatment," alcohol and drug abusers were treated together sharing the same facilities, interacting in group therapy sessions, and participating in the same program activities. In the other approach, drug abusers and alcoholics were segregated into two separate treatment groups. This latter approach is more typical of programs in the substance abuse treatment field. Funding is generally channeled to programs on the basis of their capacity to treat either alcoholics or drug abusers.

The literature contains few studies comparing the relative benefits of treating substance abusers in combined or separate treatment facilities. The Veterans Administration did conduct a study, involving 5,265 veterans at 24 facilities (7 drug programs, 7 alcohol programs, 10 combined drug/alcoholic settings) in 1975. Based on the findings from this study it was concluded that there were advantages in retaining traditional modalities, but that further research was needed to determine the type of patients (and the types of clinical problems) that do better in different modalities (Baker, S.L., et al. 1977).

In 1966 the Eagleville Hospital and Rehabilitation Center, located in Eagleville, Pennsylvania, implemented a comprehensive program directed to treatment, training, and research in the field of alcoholism. In response to the growing public concern about drug abuse in the late sixties, Eagleville broadened its mandate to include the treatment of drug addicts. Since then, Eagleville has served both alcoholics and drug addicts in a fully integrated treatment program.

The primary objective of this Eagleville Combined Treatment Research Project was to determine the relative effectiveness of treating alcoholics and drug addicts separately as compared to treating them in a combined setting. The study utilized a randomized prepost assignment in a research design. An analysis of variance with repeated measures and multiple regression correlation statistical models were the data analysis approaches selected.

DESCRIPTION OF THE EAGLEVILLE PROGRAM

The residential treatment program accepts both alcoholics and addicts. During the course of the project, the program was integrated in all aspects of service delivery. It is this program around which the present evaluation project was developed.

The major treatment components used throughout the 20-month data-collection phase of the Combined Treatment Project were essentially the same as those provided by the Eagleville residential program, which included up to 2 months of the following services: psychotherapy, education, recreation, sociotherapy (unit and community meetings), and a variety of traditional professional services (e.g., medical, psychological, and casework). The treatment plan included a weekly schedule of activities: 12 hours of psychotherapy (8 hours of group therapy over 4 days and 4 hours of individual counseling and/or motivation sessions); 10 hours of educational activities, including daily "canteen" presentations (lectures, raps, role playing, and evening Alcoholics Anonymous and Narcotics Anonymous meetings); and from 5 to 15 hours of "community" meetings (3 days/week of daily community meetings on each of the units for all staff and resident members).

Within Eagleville the term "crisis" was applied to three types of behavior prohibited in that residential program--drinking, drug taking, and threats of violence. In the event of a "crisis," the entire program would be temporarily rescheduled while the clients participated in community and group therapy sessions. Such sessions could continue for days or even weeks and result in spontaneous "minathons," "marathons," or other intensive confrontation experiences.

Clients were also involved in a wide range of routine (craftshop periods, sports tournaments), spontaneous (sports challenges, music fests), seasonal (Halloween and Christmans dance parties), and episodic (concerts, professional ball games, and plays) events. Much of the "drab weekend" challenge was coordinated by the activities department which organized and supervised weekend programs. Responsibility for the "7-day hospital" coverage was shared with administrative staff members who did not have clinical knowledge and experience.

Other staff resources were utilized to provide traditional diagnostic services (e.g., X-ray and lab) and traditional health services (e.g., medical and dental) and innovative treatment services (e.g., psychological test "feedback").

DESCRIPTION OF CLIENT POPULATION

Subjects for the research sample were drawn from Eagleville inpatient admissions between June 1974 and November 1975. All first admissions and readmissions who had no more than 7 days prior stay at Eagleville were considered eligible for the project. The Eagleville admission criteria required that prospective clients be detoxified, show no major psychological disorders or physical disabilities that would prohibit their full and active participation in the program. Only 2 percent of the prospective clients did not meet the criteria and were referred elsewhere. A small segment of otherwise eligible subjects were excluded because they left the program before providing the basic intake interview data, usually scheduled within the first 5 days.

The final sample of 689 consisted of a slightly larger alcoholic cohort (56 percent) than addict (44 percent). By age, the alcoholic sample was 5 years older (33.5 to 28.7 years). The overall sample also included far more males (87 percent) than females (13 percent), and slightly more blacks (54 percent) than whites (46 percent). Most resided in Philadelphia and Montgomery Counties (63 percent and 15 percent, respectively) with the remainder living in neighboring Pennsylvania counties.

The "alcoholic" (A) and "drug addict" (D) diagnoses (and resultant assignment to treatment units) were determined through the normal Eagleville admissions procedure involving the gathering of a substance use history and diagnosis of the current or presenting problem. Admissions personnel made the initial classification into alcoholic (A) or drug addict (D) categories. This classification was reviewed if contradictory information was subsequently gathered by clinical, treatment, or research staff.

Substance Use/Abuse Patterns

For purposes of the present study, subjects' primary diagnoses served as the basis for classification into A as opposed to D subsamples. Clients assigned a secondary substance diagnosis due to concurrent drug and alcohol use of a "problem nature" were considered to have multiple substance abuse problems.

Use of two or more different substances during one's lifetime was claimed by 98 percent of the drug addicts and 56 percent of the alcoholics. Daily use of two or more different substances during one's lifetime was claimed by 83 percent of the addicts and 37 percent of the alcoholics. Table 1 presents the drug categories used "ever" and "ever daily." Despite increasing attention paid to the multiple substance abuser, a sizable percent of the alcoholics (44 percent) reported to have used only alcohol.

Previous Treatment

Most of the sample had been treated for substance abuse before admission to this program. Seventy-seven percent (77 percent)

TABLE 1.—Substances having been "ever used" and "ever used daily" by addicts and alcoholics (in percent)

	Addicts (N=296)		Alcoholics (N=392)	
	Ever used	Used daily	Ever used	Used daily
Alcohol	100	39	100	86
Heroin	90	80	20	10
Marijuana	86	50	44	15
Amphetamines	79	48	27	9
Tranquilizers	51	28	30	22
Barbiturates	58	25	23	9
Methadone (legal)	30	27	4	4

of the addicts reported previous treatment for drug abuse, and 68 percent of the alcoholics reported previous alcohol treatment.

Referral Sources

The current entry into treatment was reported to have been under legal pressure (e.g., from courts, attorneys, or probation and parole officers) for 57 percent of the addicts and 25 percent of the alcoholics. Family and job pressure was stated to be a primary influence for only 6 percent of the sample. The sources of referral to Eagleville were treatment and social welfare agencies (42 percent), criminal justice system components (35 percent); and family, friends, or private counselors (12 percent). The remainder (11 percent) claimed to be self-referred.

RESEARCH DESIGN

As noted earlier, the study had a prepost evaluative research design with random assignment to the two settings. There were essentially four different study groups:

Group 1: All-alcoholic group--one-half of all patients with a primary diagnosis of alcoholism were assigned to a separate all-alcoholic group.

Group 2: All-addict group--one-half of all patients with a primary diagnosis of drug addiction were assigned to a separate all-addict group.

Groups 3 and 4. Combined treatment groups--all other subjects were assigned to two groups composed of approximately equal proportions of addicts and alcoholics.

These groups were assigned to treatment units within Eagleville and were treated for approximately 2½ months. Units at any one time had approximately 25 to 35 clients. Each unit was comparable in terms of the characteristics of staff members. At any one time, approximately one-half of those given a primary diagnosis of alcoholism were receiving treatment in a separate (all-alcoholic) unit, and one-half of those diagnosed as drug addicts were in an all-drug addict unit. The remainder of both groups were divided approximately evenly between the remaining two combined treatment units. Throughout the timespan of the study, each unit was given opportunity to treat all of the various kinds of groups (i.e., alcoholic only, heroin addict only, and combined groups). Table 2 shows the distribution of substance groupings into separate and combined treatment conditions.

TABLE 2.—Distribution of substance groupings into experimental treatment conditions

Treatment conditions	Substance of addiction					
	Alcohol		Drugs		Total	
Separate	167	(24)	186	(27)	353	(51)
Combined	224	(33)	112	(16)	336	(49)
TOTAL	391	(57)	298	(43)	689	(100)

[1]Numbers in parentheses indicate percentage of total sample of N=689.

Hypotheses

The following null hypotheses constituted the framework for the analysis of the data:

Hypothesis 1. Alcoholics and drug addicts treated together will show no more improvement than will comparable samples of alcoholics and addicts treated separately.

Hypothesis 2. The degree of improvement will be no greater for alcoholics than for addicts when both are treated together.

Hypothesis 3. Passivity/activity of alcoholics and addicts would not be any more or less in combined, than in single-substance, small group therapy settings.

Data-Collection Procedures

The principal mode of data collection was a structured 1½-hour interview given at admission and at the 8th and 16th months following admission into treatment. Approximately two-thirds of the subjects were interviewed at the 8-month followup periods. However, only one-half of the sample could be interviewed at the 16-month period because of time limitations imposed by the data-collection schedule.[1]

Dependent Variables

The investigator thought it would be helpful to examine both inprogram measures as well as measures of performance after leaving treatment.

Inprogram measures consisted of two types primarily. On the one hand, an attempt was made to examine issues of independence, control, trust, and treatment motivation as indices of residents' functioning within the treatment program. Ratings were made by staff therapists as well as by clients of themselves. In addition, examination was made of clients' behaviors in group therapy as rated by observers. Examples of behavior measures were verbal activity, emotional intensity, and therapeutic involvement.

Postprogram measures (followup at 8 and 16 months following admission to treatment) were collected and compared to baseline (intake) figures. These measures included. severity of substance use, criminal involvement, psychological status, social activity, salaried employment, and family/friend relationships. In addition to those indices, the investigator also examined the following individual items. alcohol use, source of income, number of substances being used, and number of days in treatment.

Independent Variables

The investigator collected data on a large number and variety of independent variables.[2] The following is a list of those variables.

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[1] For the 8-month followup cohort, 64 percent of the eligible treated subjects (438 of 689) were successfully treated, interviewed, and analyzed, 26 percent could not be located, 5 percent were in non-cooperating institutions, 2 percent refused to be interviewed, and 1 percent had died.

For the 16-month followup cohort, 70 percent of the sample sought were successfully located, 27 percent were not located.

[2] Selected variables appear as both independent and dependent variables.

- Age.
- IQ.
- Race.
- Physical consequence of alcohol use.
- Physical consequence of drug use.
- Family drug and alcohol use history.
- Subjects living alone.
- Criminal history.
- Demographic characteristics of therapist.
- Client's primary diagnosis.
- Voluntary entry into treatment.
- Client's perception of treatment environment.
- Behavior ratings of client.
- Family therapy sessions attended.
- Treatment condition (combined or separate).
- Particular treatment unit.
- Therapist behavior patterns.
- Discharge reason.
- Days in residential program.

A number of other data sources were also utilized. They included clinical records, behavior ratings by both therapists and clients; and perceptions of the treatment settings by staff, clients, and trained participant observers. The researchers also did various ratings of group therapy performance. These variables together constituted measures of inprogram performance and were collected at 2 weeks and 6 weeks after admission.

Criterion Measures (Inprogram Performance)

Group therapy sessions of 137 patients were taped, coded, and rated for the following measures:

- Verbal activity--number of spontaneous contributions, interruptions, total interactions.
- Emotional intensity--amount of animation and vocal expressiveness.
- Therapeutic involvement--statements of avoidance, suspicion, superficiality, personal sharing and risk taking, attempts to resolve conflicts, openness to new alternatives, trying new behaviors.

RESULTS--INPROGRAM MEASURES

A series of correlational analyses and analyses of variance were conducted on the abuse variables. The general results of all analyses indicated the following:

(1) Behavioral change (outcomes) in combined treatment were not significantly different from those resulting from separate treatment.

(2) Alcoholic and heroin addict clients showed similar outcomes in response to combined and to separate treatment.

(3) Significant treatment effects occurred in relation to specific treatment units.

The latter finding indicates that individual treatment units in the EHRC did obtain differing results when treating clients in combined and substance-specific settings. Some units were more effective when treating alcoholics and addicts separately while other units were more effective when patients were mixed.

A repeated measures analysis of variance was used for unequal sample sizes to analyze the group therapy criterion variables. In general, the statistically significant findings which emerged were.

(a) Behaviors had improved significantly over time in all of the therapy groups (combined and separate). Responses reflecting avoidance, differences, superficiality, and suspicion were replaced by responses reflecting personal sharing, information seeking, sharing of problems, and risk taking.

(b) There were few differences between alcoholics and addicts in their behavior (aggressiveness, passivity, impulsiveness, etc.) in groups. Their behavior was similar in the degree to which they initiated discussions, and interrupted others, etc. However, alcoholics appeared to interact more frequently with others than addicts.

(c) Changes in behavior of those alcoholics and addicts treated together were in no way different from those occurring in segregated groups.

(d) In general, performance in group therapy was not predictive of anxiety, substance abuse, or number of days clean at the 8-month followup period.

RESULTS--POSTTREATMENT MEASURES--CHANGES IN INDEX MEASURES (ENTRY, 8 MONTHS, 16 MONTHS AFTER ADMISSION)

The basic design of the combined treatment project was to evaluate the comparative effects of combined versus separate treatment. The project was also structured to investigate the relationships of other treatment and nontreatment measures to the performance levels of clients. Preliminary to the analysis of both hypothesized and exploratory subsample differences, it would be useful to look at the total sample results over the three time periods, namely at entry into the treatment program (E), 8 months after entry (E8MO), and 16 months after entry (E16MO). As with any three-point time sampling, the latter data is particularly important for determining the shape of relationships. Such data not only indicate whether treatment effects occurred (change/no change) but, if so, whether they leveled off, accelerated, or deteriorated over time.

An examination of figure 1 indicates that nearly all of the just-mentioned possibilities occurred: Family relations and salaried employment remained relatively unchanged; criminal involvement and severity of substance usage scores improved in a generally straight-line relationship, while social relations and psychological status, showed a curvilinear development.

The latter group was especially interesting in view of their differences, with social relations scores reaching their maximum at 8 months and a leveling off thereafter. Psychological status showed no early change, but improved significantly by the time of the second followup contact.

EFFECTS OF COMBINED TREATMENT OF ALCOHOLICS AND ADDICTS ON DIFFERENT OUTCOME MEASURES

In addition to examining changes in the treatment population over time, there was also an attempt to determine whether (a) combined versus separate treatment and (b) drug or alcohol diagnosis had any significant impact on treatment outcomes. The explanatory powers of other independent variables were tested also. Tables 3 and 4 present the findings of the multiple regression analysis that attempted to explain percentage of variance in the dependent variables as explained by a number of independent variables. It should be noted that the R^2 maximum prediction values indicates the percent variance in the dependent variable explained by all the independent variables. The R^2 residual indicates the percent variance that is predictable beyond the pretreatment levels.

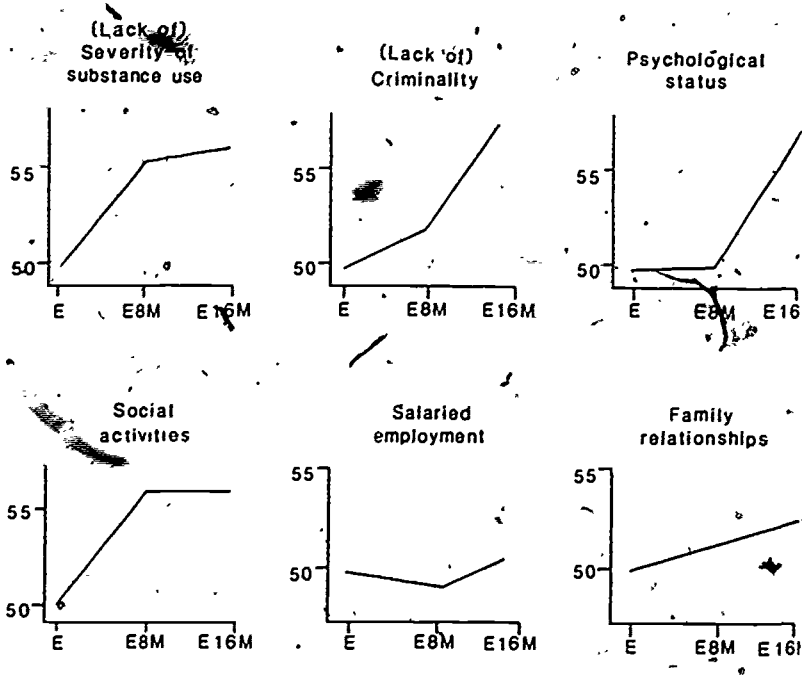
The tables reflect the finding that combined versus separate treatment and primary diagnosis of drug or alcohol explain little of the variance on any of the outcome variables included in the table and in the study. Thus, these variables appear to have little statistical or explanatory power.

Overall, several important conclusions emerge from analysis of these data:

(a) There were few differences between addicts and alcoholics on the criterion variables selected.

(b) There were only small differences between those subjects treated in different types of modalities. In other words, when predicting subsequent followup behavior, it made no difference whether a patient was treated in a combined or separate program.

FIGURE 1. *Criterion index changes*



[1] All subjects with entry, entry & 8 months, and entry & 16-month followup data. E-scores based on data from 3 months prior to entry into EHRC. E8M-data re 3 months prior to 8-months' followup. E16M data re 3 months prior to 16-months' followup.

[2] Standard scores based on entry data, transformed to $\bar{X}$=50 and s=10.

SUMMARY AND CONCLUSIONS

For the past several years the treatment community has been concerned with understanding the advantages and disadvantages of combined treatment. Numerous questions have been raised about this issue. Does categorical funding place unnecessary restrictions on programs that may have the capability of treating alcohol and drug abuse clients together? Is anything lost in the "nonspecificity" of treatment? Are gains achieved in focusing on the client's multiple drug problems? What kind of impact will alcohol and drug users have on each other in a combined treatment environment?

It was concluded that research was needed to address these and other related issues. Eagleville Hospital was in a unique position to initiate a research/demonstration program, having explored the issues in depth and having had considerable experience in administering a combined treatment program.

The major findings from this study were:

- There were no differences in outcome between those treated in a combined modality and those treated in substance-specific modalities (only alcoholics or only addicts).
- Few differences were found in the way addicts and alcoholics interacted with one another in community and group activities. (Previously it had been believed that drug abusers might be more aggressive and possibly dominate group interactions.)
- At followup there were few differences between addicts and alcoholics in the criterion variables selected. The only difference of significance was that those who had been involved in combined treatment were less likely to abstain totally from alcohol than those exposed to single treatment.

These findings have important application to the field. Certainly, there must be more consideration to the development and implementation of combined treatment programs. There are obviously some benefits to be derived in combined services including increased efficiency and cost savings.

It should not be concluded on the basis of this research that all substance abusers can be treated in the same type of modality. Clients come from many different backgrounds, with many different problems and needs. Clinicians must take all of these differences into consideration in developing an appropriate treatment plan and selecting an appropriate treatment program. We must begin to focus our investigations on different types of clients to find out more specifically which types seem to do best in combined treatment and which types require alcohol- or drug-specific treatment.

TABLE 3.—*Multiple regression correlation analysis of dependent variables, 8-month followup status (N=438)*

	Severity of substance usage	Criminality	Psychological status	Social activity	Days in treatment	Salaried employment index	Family/friend relationship index	Median (nondirect)
R^2: Pre versus 8-months treatment	0.0578	0.0319	0.0690	0.0278	0.0081	0.0142	0.0259	0.0278
R^2 Change								
Substance (alcohol>drugs)	[1].0108	[1].0130	.0044	.0009	[1].0003	[1].0074	[1].0026	.0044
Treatment (combined>separate) [2]	.0012	[1].0061	.0058	[1].0002	[1].0002	[1].0021	.0000	.0012
Treatment × substance	[1].0003	.0000	.0002	.0026	.0000	[1].0036	.0000	.0002
R: Pre versus 8 months	.2401	.1786	.2627	.1668	.9090	.1191	.1610	.1668
R: Maximum prediction	.4066	.4630	.4028	.3882	.3618	.3386	.3627	.3882
R^2 Maximum prediction	.1653	.2144	.1623	.1507	.1309	.1148	.1315	.1507
R^2 Residual	.1077	.1825	.0933	.1229	.1228	.1006	.1056	.1077
Percent of residual variance (by data domains)								
Background	*49*	*62*	*49*	*28*	*14*	*51*	*41*	*49*
Demographic	21	10	13	13	5	36	13	13
Past History	28	52	36	15	9	13	28	26

TRT stance	12	6	11	30	10	14	26	12
Treatment	19	30	40	36	43	31	29	31
Systems	12	24	29	21	20	19	24	21
Therapist: Demographic	3	4	5	8	11	5	4	5
Group Behavior	4	1	5	7	12	7	1	5
Treatment stay	19	2	1	6	33	5	4	5
Significant "best predictors" of 8-month status (stepwise regression)[3]								
1	AGE[1]	PRISN[1]	ANYFT	RBR:AR	# DAYS	AGE[1]	RBR:C	
2	No NOTC	UW>Z[1]	ALCON	UW>Z	UW>Z	PHASE	PHASE[1]	
3	SUBMIX[1]	PHASE		BETA	STFSEX[1]	BETA	SEC	
4	PRISN	AGE[1]		AFFSUP[1]	UWZ>XY			
5	SUBST[1]	BETA						

[1] Negative relationships (indicated thus since all R^2 values necessarily must be positive).

[2] Particularly important in considering combined versus separate treatment conditions

[3] Abbreviations for best predictors represent the following variables. No NOTC—Residents dropping out of treatment program without notice, SUBMIX—Subjects with both alcohol and drug diagnose., PRISN—Lack of imprisonment past 3 months; UWZ—Unit W higher than Unit Z, PHASE—Phase 3+4 1+2, BETA—Beta "IQ" scores, ANYFT—Subjects receiving any amount of family therapy, RBR.AR—RBR factor A, by residents' self ratings, AFFSUP—Therapist style of providing affective support # DAYS—Number of days in the 60-day residential program, STFSEX—Sex of therapist, M F, RBR.C—RBR factor C, staff and resident composite, SEC—High socioeconomic status, ALCON—Physical consequences of alcohol use, SUBST—Subjects primary diagnosis, TRTDC—Treatment condition, MANAGE—Managing style, PRISCC—recent prison; ENTVOL—Entered treatment voluntarily.

TABLE 4.—*Multiple regression correlation analysis of dependent variables, 8-month followup status (N = 438)*

	Alcohol use	Illegal income	Number of family members using	Number of substances	Urinalysis	Welfare status	Work status
R^2: Pre versus 8-months treatment	0.0203	0.0005	0.0263	0.0380	0.0163	0.0617	0.0513
R^2 Change							
Substance (alcohol>drugs)	.0062	[1].0254	.0005	[1].0211	[1].0006	[1].0058	.0009
Treatment (combined>separate)	.0126	.0007	[1].0001	.0035	.0001	.0002	.0003
Treatment × substance	.0000	[1].0013	.0012	.0000	[1].0063	[1].0043	.0027
R: Pre versus 8 months	.1423	.0232	.1621	.1949	.1277	.2484	.2256
R: Maximum prediction	.4194	.3984	.3075	.4142	.3092	.4848	.3904
R^2 Maximum prediction	.1758	.1587	.0946	.1716	.0956	.2351	.1524
R^2 Residual	.1555	.1582	.0683	.1336	.0793	.1734	.1011
Percent of residual variance (by data domains)							
Background	*34*	*40*	*47*	*66*	*34*	*30*	*42*
Demographic	14	20	21	33	24	15	27
Past History	20	20	25	33	9	15	15

TRT stance	3	24	10	7	14	28	16
Treatment	35	31	39	19	39	28	36
Systems	25	6	24	10	20	10	16
Therapist: Demographic	8	10	11	4	7	6	12
Group Behavior	2	14	3	5	12	12	10
Treatment stay	30	5	5	8	14	13	6
Significant "best predictors" of 8-month status (stepwise regression)[3]							
1	# DAYS[1]	AGE[1]	SUBMIX[1]	AGE[1]		No NOTC[1]	RACEDC[1]
2	No NOTC[1]	RBR:AR[1]		SUBMIX[1]		AGE[1]	BETA
3	UW>Z	SUBSTCC		SUBSTCC[1]		RACEDC[1]	ENTVOL
4	TRTDC	MANAGE		PRISCC			
5	RACE						

[1] Negative relationships (indicated thus since all R^2 values necessarily must be positive).

[2] Particularly important in considering combined versus separate treatment conditions.

[3] Abbreviations for best predictors represent the following variables: No NOTC—Residents' dropping out of treatment program without notice; SUBMIX—Subjects with both alcohol and drug diagnoses; PRISN—Lack of imprisonment past 3 months, UWZ—Unit W higher than unit Z; PHASE—Phase 3+4—1+2; BETA—Beta "IQ" scores; ANYFT—Subjects receiving any amount of family therapy; RBR.AR—RBR factor A, by residents' self-ratings; AFFSUP—Therapist style of providing affective support; # DAYS—Number of days in the 60-day residential program; STFSEX—Sex of therapist; M-F; RBR:C—RBR factor C, staff and resident composite; SEC—High socioeconomic status; ALCON—Physical consequences of alcohol use; SUBST—Subjects primary diagnosis; TRTDC—Treatment condition; MANAGE—Managing style; PRISCC—recent prison; ENTVOL—Entered treatment voluntarily.

CHAPTER V

The Problem Drinking Drug Addict

Harriet L. Barr, Ph.D., and Arie Cohen, Ph.D.

INTRODUCTION

"The Problem Drinking Drug Addict" study originated from a NIDA grant that extended from 1973 through 1977. A major objective of the grant was to examine the occurrence of alcohol abuse among heroin addicts and the effect that alcohol has on patient treatment and outcome.

The need for such a study was based to some extent on the prevalence figures cited in the literature of mixed drug and alcohol abuse. In addition, drug and alcohol programs have experienced considerable problems with mixed addictions, such as clients in methadone maintenance programs consuming excessive quantities of alcohol. Eagleville Hospital and Rehabilitation Center by virtue of its philosophy toward substance abuse, and its management of both drug and alcohol abusers within the same facility, provided a setting where a study of large-scale multiple substance problem was possible.

The "Problem Drinking Drug Addict" study[1] examined two distinct treatment groups. a sample of residents in Eagleville's abstinence residential therapeutic community (EHRC) and a sample of patients from 10 methadone maintenance treatment programs (MMT[illegible] in the Greater Philadelphia area. The major objective of the project was to document and systematically investigate the occurrence of alcohol abuse in drug addicts and its effect on their treatment and rehabilitation.

A number of issues are considered. The first issue deals with the prevalence of alcohol abuse among the set of individuals identified primarily as drug abusers. Second, what psychosocial

[1] A separate NIDA report presents the methodology and findings of this study in greater detail. See H.L. Barr and A. Cohen, The Problem-Drinking Drug Addict (Rockville, Md: National Institute on Drug Abuse, 1979).

differences exist between drug abusers with a history of alcohol abuse and those with no alcohol abuse history. A third area of inquiry is in regard to how knowledge obtained at intake, including detailed alcohol use histories, enables an understanding of treatment process and outcome. A fourth study area examines these above issues as they apply to two different populations: the EHRC group and the methadone maintenance clients.

The study was guided by two general hypotheses:

(1) A history of problem drinking prior to treatment will be associated with problem drinking after entering treatment as well as with other indices of poor rehabilitation; and

(2) Alcohol abuse occurring after entrance into treatment will be associated with poorer progress in treatment and poorer outcome in regard to drug abuse, employment, involvement in the criminal justice system, and psychological status.

METHODOLOGY

The Sample

The sample was composed of 586 methadone maintenance patients drawn from 10 outpatient methadone maintenance treatment clinics in the Greater Philadelphia area and 280 drug addicts admitted to the EHRC. Overall, the combined sample showed a median age of 26 years, with a range of 17 to 60 years, was predominantly male (only 27 percent female), black (2 percent Hispanic and 35 percent white), and not well educated (60 percent did not complete high school). In the 2 years prior to admission, the median number of months employed was 6, and 31 percent of the sample did not work at all in that period. Eighty-seven percent of the sample had been arrested--50 percent were arrested six or more times. Forty percent of the sample had spent at least a year in prison. Only 47 percent of the patients were in intact homes at age 12. Most of their families had histories of psychopathology and included members who evidenced excessive drinking problems. The mean amounts of time since first use of a psychotropic substance and first use of a narcotic were 13 years and 8 years, respectively.

Differences Between the Methadone and TC Samples

Compared with methadone subjects, those entering the residential abstinence TC (EHRC) were somewhat younger (mean of 25.6 years versus 28.5), and had a more equal racial balance (42 percent black). While 92 percent of the methadone patients were living in the community before entering treatment, only 42 percent of the EHRC patients were (31 percent from prison, 24 percent from hospitals or residential drug programs, 3 percent other).

As measured by their educational and criminal justice histories, by their report of family psychopathology, and by their psychological self-report, the addicts entering EHRC had more extensive behavioral and psychological instability. They began using drugs at a younger age (mean of 14.2 years versus 17); however, the average interval between first drug use and entrance to treatment was the same, 11 years.

In the TC, 69 percent stated that the primary problem for which they were in treatment was narcotics, while 31 percent gave another drug (most often amphetamines) as their primary problem. As expected, all methadone subjects gave a narcotic drug as their primary problem. Most of the narcotic addicts in both the TC and methadone programs abused other substances as well as narcotics, and many of the "polydrug" patients used narcotics as well as other drugs. The social and psychological instability of the TC subjects suggests that they included a larger proportion of the types of addicts who are in need of considerable support.

Throughout this report, three sets of Ns are reported. In all analyses where only intake data are reported, the full sample of 866 addicts is used. The total number followed up was 764 (242 EHRC subjects and 522 methadone subjects), and this is the N used in reporting outcome measures in areas other than substance use and abuse, omitting the 102 subjects on whom no followup data are available. For followup measures relating to drug and alcohol use, an additional 106 subjects whose followup interviews were conducted in prison were excluded, because someone who is abstinent only because he is in prison is not the same as someone who is voluntarily abstinent. For those measures, therefore, N is further reduced to 658 (190 EHRC subjects and 468 methadone subjects).

Further, it should be noted that, while the sample contains both methadone maintenance and EHRC patients, the effectiveness of these two modalities cannot be compared in this study. There are a number of reasons why this comparison cannot be made. First, the programs treat different types of clients as can be seen in the above sample description. Second, the treatment goals and methods (abstinence versus chemotherapy) of the programs are not identical. Third, only one therapeutic community was chosen to be studied and whether it is representative of other therapeutic communities is not established. Fourth, the MMTP patients were treated on an outpatient basis, and thus were more at risk than were the therapeutic community patients who spent some time in an inpatient phase.

For these reasons, then, the two modalities cannot be compared with one another. Rather, the findings for the two groups are presented side by side so that the reader may see how alcohol problems play a role in the total substance abuse picture of two different treatment populations.

Data Sources

Data for the study came from a number of different sources. The primary source was an extensive interview conducted at intake and another followup interview conducted 12 months later. Additional data sources (not to be presented in this chapter) included urine tests, periodic reports by counselors, the Bender-Gestalt and Cornell Medical Indexes.

MEASURES

A number of measures were created for this study from the interviews and other data sources. These measures included--

(1) Quantity of alcohol consumed--this was a measure of the average daily consumption of alcohol in the 2 months prior to the intake and followup interviews. Clients were also asked a series of questions which would establish their lifetime maximal level of alcohol consumption.

(2) Drug use--the reported use of drugs in the 2 months prior to either the intake or followup interview. A drug-use index was developed which gave greatest weight to the frequency of illicit narcotics use; moderate weight to unprescribed use of barbiturates, sedatives, tranquilizers, and stimulants; and lowest weight to marijuana use.

(3) Alcohol-related problems--this scale was derived from a series of items which measure loss of control over use of alcohol (inability to control use), bad reactions to alcohol use (fits, anxiety, visual distortions, memory lapses, etc.), and life consequences of alcohol use (job and school problems, marital problems, and problems in social relationships). The alcohol scale also included number of times intoxicated for a full day or more. The subject was asked to assess whether he had ever experienced the above-listed problems as a result of alcohol use and whether he had experienced them at any point in his lifetime in the 2 months prior to admission and prior to the followup interview. This scale was based on a total of 13 points. The cutoff point for a high alcohol problems score was 5 or more points.

(4) Drug-related problems--an identical scale (with the exception of number of times intoxicated) was constructed for drugs; the data were collected for the lifetime history and for the period 2 months prior to followup. Again, the subject was asked to assess whether such problems were due to the use of drugs.

(5) Dysphoria--a composite scale which measures depression, phobic anxiety, and (with sign reversed) happiness. This was obtained for the 2 months prior to admission and prior to the followup interview.

(6) Criminal justice involvement--an index of involvement in criminal activities (number of arrests, convictions, and time spent in prison) in the 12-month followup period. Intake data were experience on these variables up to admission to program.

(7) Months employed--number of months employed in the 12-month followup period. Intake data were number of months employed in the 2 years prior to admission.

Throughout the chapter the following terms, based on some of the above variables, will be used to characterize the patterns of alcohol use and abuse by the clients.

Problem drinker. A problem drinker is defined as one who has a high alcohol problem score (above 5 on a scale of 1-13). The overwhelming majority of problem drinkers were also "heavy drinkers" (93 percent on the basis of pretreatment lifetime history; 85 percent at the time of followup), but this need not be the case.

Heavy drinker. A heavy drinker is defined as one with a high level of alcohol consumption (above 3.82 ounces daily consumption of 90-proof whisky). A heavy drinker may or may not describe himself as a problem drinker. In the lifetime history obtained on intake, 49 percent of heavy drinkers were also classified as problem drinkers; at followup the proportion was 45 percent.

Moderate drinker. A moderate drinker is one who reports some consumption of alcohol, but at a level below that classed as heavy drinking. A moderate drinker is unlikely to report a significant number of alcohol-related problems, but he may. With the cutoff points used in this study, 7 percent of moderate drinkers were labeled as problem drinkers with reference to the lifetime pretreatment history, and 13 percent of moderate drinkers on followup were also scored as problem drinkers at that time.

Abstainer. Abstainers are those who report no consumption of alcohol.

Each of these terms will be used to characterize the drinking behavior of subjects with reference to the different time frames reported. The drinking history obtained in the intake interview will be identified as past or current. Current problem drinking refers to a high current problem score. Current heavy drinking refers to a high level of alcohol consumption reported for the 2-month period prior to admission. A past problem drinker is one with a high lifetime alcohol problems score, but not a high current problems score. A past heavy drinker is one who reported a high lifetime maximum level of alcohol consumption, but not a high level in the 2 months prior to admission.

DRINKING TYPOLOGIES

Based on some of the preceding variables, two typologies--a preadmission drinking typology and a followup drinking typology--were produced. These typologies were based on quantity of alcohol consumed and the alcohol-related problems scales. The followup types are comparable to the empirical typology developed from the intake data, except that the current versus past distinction is not relevant.

Table 1 contains the sample classified by the preadmission drinking typology and it also contains a comparison group of alcoholics. Types I and II represent the persons with either a past or current history of problem drinking. Types III and IV reported high alcohol consumption (past or current) but with few associated problems. Types V and VI represent moderate drinkers and abstainers. Type VII was a small residual category of persons who did not fit into the typology and these persons were dropped from further analysis.

As expected, almost all of the alcoholics are found in the types I and II--the more serious drinking categories. The typology also indicates very serious alcohol involvement among the addicts; one-quarter of the addicts can be found in types I and II.

The followup typology consists of five types:

		Percent of total narcotic addict sample
A.	High consumption and high problems	13.7
B.	High problems but consumption moderate or no consumption	2.4
C.	High consumption but few or no problems	16.6
D.	Moderate consumption but few or no problems	33.4
E.	No drinking at all	33.9

FINDINGS

Correlates of the Preadmission Drinking Typology

Having identified six types of preadmission drinking histories which accounted for virtually all of the drug addicts in the sample, the next question to be addressed is whether this typology has implications beyond their drinking behavior. Particularly important were the implications for social characteristics, drug use and

TABLE 1.—Preadmission empirical typology of drinking histories

Type	Alcohol consumption: Maximum	Alcohol consumption: Current	Lifetime alcohol problems	Percent of alcoholics	Percent of all drug addicts	Percent of EHRC drug addicts	Percent of MM drug addicts
I	High	High	High	77.6	13.7	11.4	14.8
				95.6	24.5	27.9	22.9
II	High	Moderate, none	High	18.0	10.7	16.4	8.0
III	High	High	Low, none	1.8	11.4	7.5	13.3
				3.1	25.8	21.4	27.8
IV	High	Moderate, none	Low, none	1.3	14.3	13.9	14.5
V	Moderate	Moderate, none	Low, none	.4	25.3	25.4	25.3
				.4	47.9	47.9	48
VI	None	None	None	--	22.6	22.5	22.7
VII	Moderate	Moderate, none	High	.9	1.8	2.9	1.4
				N=228	N=866	N=280	N=586

Labels:
I. Current problem drinkers (and heavy drinkers).
II. Past problem drinkers (and heavy drinkers).
III. Current heavy drinkers (no history of problems).
IV. Past heavy drinkers (no history of problems).
V. Moderate drinkers (no history of problems).
VI. Abstainers.
VII. Moderate drinkers with problems.

its consequences, and psychological characteristics. When the six drinking types were compared on a number of measures relevant to these three areas, it became apparent that consistent differences in pretreatment measures were associated with a broad dichotomization of subjects. problem drinkers, past or present (types I and II) and those without such a history (types III-VI). The problem drinking drug addicts seem to have had significantly[2] more learning and behavioral problems in school than the nonproblem drinking drug addicts, with hyperactivity a major feature, though they did not seem to have experienced any more official negative sanction for their deviant behavior. The home situations of the problem drinkers were more disturbed--they more often reported the presence of violence, excessive drinking, and mental illness in the home, the absence of the mother (including through her death), and in general characterized their childhoods as unhappy. Problem drinking drug addicts also reported significantly more involvement with the criminal justice system (arrests and time spent in jail). In regard to their drug use, although the problem drinkers did not differ significantly on reasons for their drug use, they experienced more problems with their drug use as measured by the scales described earlier. The problem drinkers were also more psychologically disturbed than other addicts, particularly on the dimensions of depression, phobic anxiety, dependence on others, resistance to authority, and sociability and happiness. They more often reported suicidal thoughts and actions. In general, then, the problem drinkers constituted a more extreme group within the general sample of addicts studied.

Insofar as drug use based on the drinking typology, table 2 points out the number of drug categories used by drinking types. As regards the specific drug categories, the current heavy drinkers reported significantly greater current use of narcotics, amphetamines, marijuana, and tranquilizers. Their use of the other two categories--sedatives and cocaine--was somewhat, but not significantly, greater than that of other subjects.

CHANGE OVER THE YEAR OF OBSERVATION

It was important to determine whether there had been any consistent change during the year of observation for each of the study's outcome criteria.

The procedure involved a separate analysis for the EHRC sample and the methadone maintenance sample, as well as including treatment retention in both groups to examine different outcome.

Table 3 shows the change from intake to followup status for each of the outcome variables, and tests the significance of change by

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[2]Significance level used for this portion of the study was $p < 0.05$.

TABLE 2.—Number of drugs used and number used regularly in the 2 months before intake by drug addicts with different drinking histories

Type	N	Excluding alcohol: Mean number of drug classes used		Excluding alcohol: Mean number of drug classes used regularly		Including heavy alcohol use: Mean number of drug classes used regularly	
I	107	2.83	2.86	2.22	2.24	3.22	3.24
III	88	2.90		2.26		3.26	
II	86	2.23	2.32	1.60	1.66	1.60	1.66
IV	109	2.40		1.72		1.72	
V	192	2.32		1.65		1.65	
VI	168	1.89		1.48		1.48	
VII	14	3.21		2.36		2.36	
All cases	764	2.38		1.78		2.04	
(Standard deviation)		(1.42)		(1.18)		(1.34)	
r with current alcohol consumption		[1]0.303		[1]0.300			

[1] $p < 0.001$.

Labels:
I. Current problem drinkers (and heavy drinkers).
II. Past problem drinkers (and heavy drinkers).
III. Current heavy drinkers (no history of problems).
IV. Past heavy drinkers (no history of problems).
V. Moderate drinkers (no history of problems).
VI. Abstainers.
VII. Moderate drinkers with problems.

NOTE: The N's in this table include only subjects for whom followup data is available, since this table was generated for comparison with drug use on followup.

t-tests for correlated means. It is apparent that clients in both treatment modalities showed highly significant reductions in drug use, drug-related problems, and dysphoria. In both modalities, there were very great and highly significant ($p < 0.001$) reductions in the use of all drug categories except marijuana. Although EHRC subjects reduced marijuana use significantly ($p < 0.01$), methadone subjects showed no change in marijuana use on the average. It is worth noting that there were significant pretreatment differences between the two samples in their drug use patterns, with EHRC subjects reporting more use of sedatives and amphetamines, while methadone subjects reported more use of narcotics and cocaine. A year later, the only significant differences in drug categories were the lower use of marijuana and cocaine by EHRC subjects. As a result, the differences between methadone and EHRC subjects in the drug use index was reduced, but remained statistically significant. Average months of employment per year did not change among EHRC subjects, while for methadone subjects there was a statistically significant but seemingly small reduction in months worked.

Most notable, perhaps, is the lack of change in alcohol-related problems, and the fact that alcohol consumption dropped from the level on admission only for methadone subjects. Prior to intake, consumption was higher for methadone than for EHRC subjects ($p < 0.001$). On followup, the level of consumption of methadone subjects had dropped although it remained still higher than that of EHRC subjects.

Table 4 shows the relationships between each of the followup measures and retention in treatment. Since the two modalities differ both in the nature of their programs and the populations that they serve, data are presented separately for the EHRC and methadone samples.

For EHRC, retention in treatment was measured by successful completion of the 2-month inpatient phase of the program leading to a "treatment completed" discharge; 53.3 percent of the EHRC residents achieved that status. For the methadone programs, those who remained in treatment continuously for the entire year of observation (31.4 percent of the methadone clients) were compared with those who were discharged at least once, whether they were readmitted to treatment or not.[3]

Retention in treatment is associated with superior status on a majority of the seven outcome measures in each modality, although the measures are not the same for each. Clients who remained in

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[3]An additional 8 percent were discharged as "treatment completed," and might have been included in this group. Since criteria vary from program to program, and are often difficult to ascertain, it was decided to use the unequivocal criterion of continuous treatment.

TABLE 3.—Change in mean criterion measures[1] over 1 year of observation, by treatment modality

	EHRC N=190/242			Methadone N=468/522		
	Intake[2]	Followup	t	Intake[2]	Followup	t
Alcohol consumption score:	2.16	2.41	1.03	3.40	2.96	[3]3.15
(Equivalent ounces)	(.26)	(.33)		(.79)	(.55)	
Alcohol problems	1.22	1.18	0.16	.98	1.11	1.29
Drug use[4]	3.30	2.23	[5]5.30	4.12	2.71	[5]13.04
Drug problems	10.40	3.88	[5]19.64	9.48	3.75	[5]32.71
Dysphoria	31.27	22.76	[5]11.25	28.59	21.97	[5]14.09
Months employed per year	4.31	4.17	0.42	4.06	3.43	[3]2.97

[1]Change cannot be assessed for the criminal justice measure, because the intake measure covers the lifetime history, while the followup measure covers only 1 year.
[2]The intake scores for alcohol consumption, alcohol problems, and drug use refer to the 2 months prior to intake. Months employed is based on the 2 years before intake, divided by 2, so as to be comparable with the 1 year of followup.
[3]$p < 0.01$.
[4]In all subsequent analyses of data, prescribed drugs were excluded from the drug use index. Information about prescribed use was unfortunately not available in the intake interview, however. Drug use on followup has therefore been recomputed without discounting prescribed use for this table, so that intake and followup may be compared.
[5]$p < 0.001$.

NOTE. The first N given for each group applies to the four drug and alcohol measures, where only those at risk (i.e., not in prison) were included. The second N includes all subjects followed at 1 year.
The t test for correlated means was used.

TABLE 4.—Mean outcome criterion measures as a function of treatment retention, by treatment modality

	EHRC			Methadone		
N=	Completed program 102/129	Did not complete 88/113	t	Continuous treatment 164	2 or more discharges 304/358	t
Alcohol consumption score: (Equivalent ounces)	1.99 (.22)	2.89 (.52)	[1]2.47	3.09 (.62)	2.89 (.52)	0.76
Alcohol problems	.81	1.61	[1]2.14	1.29	1.02	1.15
Drug use (prescribed drugs excluded)[2]	1.69	2.10	1.54	1.93	2.64	[3]4.25
Drug use (prescribed drugs not excluded)	2.12	2.36	0.86	2.20	2.99	[3]4.51
Drug problems	2.83	5.10	[3]3.70	2.74	4.30	[3]4.27
Dysphoria	21.42	24.30	[1]2.42	21.93	22.39	1.47
Criminal justice index	.56	2.58	[3]3.83	.53	1.69	[3]8.46
Months employed per year	4.09	3.23	[3]3.41	4.62	2.88	[3]5.44

[1] $p < 0.05$.
[2] In all subsequent analyses of data, the drug use index was computed with prescribed drugs excluded. It is also presented here without excluding prescribed drugs to facilitate comparison with table 5.
[3] $p < 0.001$.

treatment in either modality showed significantly less involvement with the criminal justice system and more months of employment.

EHRC clients who remained in treatment showed reduced (but not statistically significant) use of drugs. Methadone clients who had remained in the same program for the entire year were using drugs significantly less on followup than were those who had left treatment. The drug categories responsible for the decrease for the methadone clients were narcotics, sedative-barbiturate drugs (both at the 0.001 level), and tranquilizers (0.01 level).

Dysphoria was significantly greater among EHRC ex-residents who failed to complete the inpatient program than for those who did so. It should be noted (table 3) that the average level of dysphoria on intake was greater in the EHRC sample than among the methadone clients. The differences in the outcome dysphoria mean scores shown in table 4 arise because those completing the EHRC program had greater decrease in dysphoria over the year of followup than did the EHRC dropouts or either of the methadone treatment groups.

Both alcohol consumption and alcohol-related problems were significantly less among those completing the EHRC program than among those who failed to complete treatment. Can this be considered a treatment effect, since table 3 showed no overall reduction in these measures for the entire EHRC sample? That this may be a possibility is suggested by the fact that EHRC ex-residents who completed treatment showed a decrease in both measures, while those who did not complete treatment increased both their consumption of alcohol and related problems. If there was indeed reduction in alcohol use and abuse attributable to completing the EHRC program, it may be the product of the strong abstinence ethic pervading Eagleville, as well as the influence of being treated together with alcoholics in combined treatment.

In the methadone maintenance sample, those in continuous treatment showed slightly less alcohol consumption and alcohol problem scores than those with one or more discharges. One of the methadone programs in the study, however, was notable for the reduction in alcohol consumption among its clients, whose consumption prior to admission was well above the average. It is of interest that this program is part of a larger facility that is well known for its alcoholism program. It seems likely that its staff is alerted to alcohol problems and is more skilled at dealing with them than the staffs of other methadone programs not affiliated with an alcoholism program.

PROBLEM DRINKING, HEAVY DRINKING, AND TREATMENT OUTCOME

We are now able to test the hypotheses of this study--the relationships between problem drinking, both before and after admission

to treatment, and the outcome of treatment as assessed by its primary goal of reducing drug use and associated problems, of alleviating dysphoria and criminal behavior, and increasing employment. We have already seen that a significant degree of improvement occurred in most of these aspects of behavior over the course of the followup year and, furthermore, that retention in treatment was associated with better followup status for both the methadone and the Eagleville samples. To what extent can differences among subjects in their followup status be understood and, perhaps, be accounted for by their involvement with alcohol at various stages of treatment?

Table 5 presents, for the entire followup sample, the correlations of the four alcohol measures obtained on intake and the two alcohol measures obtained on followup with each other, and with the five other outcome measures. It shows, first of all, as has already been shown in other ways, that the alcohol measures are highly intercorrelated, both within each interview and between the intake and followup interviews.

It is the lower portion of table 5, however, which tests and, in most respects, confirms the hypotheses of the study. It shows that four of the five outcome measures were each significantly correlated with two or more of the four intake alcohol measures. Furthermore, each of these four outcome measures was significantly correlated with both of the outcome alcohol measures, and they were more strongly related to drinking behavior on followup than to the drinking behavior and history reported at intake. The one outcome measure for which the hypotheses were not confirmed was employment which, as we have seen in table 3, was also the only measure that did not show significant improvement over the year of observation. It must be noted that in instances of significant correlations, the correlations are sometimes indicative of weak associations, and the reader must be guarded about inferences. Significant correlations of 0.09 and 0.14, for example, would explain 0.01 and 0.02 percent of variance, respectively.

Is Heavy Drinking in Itself a Poor Prognostic Sign?

We have seen that when alcohol-related problems and high levels of alcohol consumption are considered separately, each of these measures of the person's involvement with alcohol is associated with one or more indications of poor treatment outcome. This is so whether the focus is on the lifetime pretreatment drinking history, the 2 months just before intake, or 12 months after entrance to treatment. Alcohol consumption and problems are, however, closely linked. Is it possible to sort out the relative contributions of problem drinking and heavy drinking to the prediction of poor treatment outcome?

In trying to do this, it is necessary to deal with the fact that the relationship between alcohol problems and consumption is not symmetrical. For each time frame, about half of those reporting heavy drinking also reported a high level of problems, while half

TABLE 5.—Correlations of intake and outcome drinking measures with other measures of outcome and with each other

	Alcohol consumption, current	Intake drinking measures			Outcome drinking measures	
		Alcohol consumption, lifetime	Alcohol problems, current	Alcohol problems, lifetime	Alcohol consumption	Alcohol problems
Intake						
Alcohol consumption, current						
Alcohol consumption, lifetime	[1].66					
Alcohol problems, current	[1].54	[1].40				
Alcohol problems, lifetime	[1].44	[1].65	[1].67			
Outcome						
Alcohol consumption	[1].40	[1].34	[1].26	[1].28		
Alcohol problems	[1].36	[1].31	[1].43	[1].39	[1].58	
Drug use	[1].12	[2].11	.4	.4	[1].26	[1].21
Drug problems	.4	[3].09	[2].10	[2].10	[1].16	[1].31
Dysphoria	[3].09	[2].10	[1].19	[1].12	[3].08	[1].29
Criminal justice index	-.1	[3].09	.7	[1].14	[1].12	[1].20
Months employed	-.5	-.5	-.3	0	-.2	[2]-.9

[1] $p \leq 0.001$. [2] $p \leq 0.01$. [3] $p < 0.05$.

NOTE-- Decimal points are omitted. N=658 for all r's involving 12-month alcohol and drug measures, 764 for all other r's.

did not. Problem drinking, however, was rarely reported in the absence of heavy drinking, for the lifetime pretreatment history, only 7 percent of problem drinkers did not report heavy drinking. Thus, the comparison that is both useful and feasible to make is between heavy drinkers who are also problem drinkers and heavy drinkers who deny a significant number of problems stemming from their drinking.

Table 6 compares the outcome status of three groups of subjects: problem drinkers who are also heavy drinkers, heavy drinkers who are not problem drinkers, and those who did not report either heavy drinking or problem drinking (i.e., moderate drinkers and abstainers).[4] These three groups are defined for three different time frames: the lifetime pretreatment history, the 2 months before admission, and the 2 months before the 12-month followup interview. Omitted from this table are the small groups of subjects who reported problem drinking in the absence of heavy drinking, since their numbers are too small to provide reliable means; in general, their outcomes resembled those of other problem drinkers for the time frame in question.

Although our focus is on the nondrinking aspects of outcome, the two outcome alcohol measures are included for the sake of completeness. They are, however, omitted from the comparison of the followup drinking groups, since these measures form the basis for the definition of the followup groups. Such a comparison would therefore be tautological. Means are presented in two forms: mean raw scores, and z-scores, standardized so that all variables have a mean of zero and a standard deviation of 1. The standard scores facilitate comparisons of different outcome measures.

Table 6 shows that problem drinkers, as expected, had poorer outcomes than moderate drinkers and abstainers.[5]

The middle column shows the effect on outcome of heavy drinking in itself. It shows that a history of heavy drinking reported at intake to treatment, without the report of a significant number of alcohol-related problems, was associated overall with poorer outcomes than the moderate drinkers and abstainers achieved, but

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[4] Although moderate drinkers and abstainers were differentiated in the analyses of data, they did not differ in treatment outcome, except for outcome alcohol measures, on which both nevertheless had much lower scores than did the preadmission problem drinkers and heavy drinkers.

[5] All of the differences between problem drinkers and the moderate/abstainer subjects were statistically significant, with the exception of months employed versus the lifetime history, and criminal justice involvement and months employed versus the 2-month preintake history.

TABLE 6.—*Comparative outcome scores of problem drinkers, heavy drinkers and others, based on lifetime pretreatment history, 2-months prior to admission to treatment, and followup*

[In Raw Scores and Standard Scores]

	Problem drinkers who are also heavy drinkers		Heavy drinkers (not problem drinkers)		Neither	
Based on lifetime pretreatment history:						
Types (number of cases [1])	I, II (168/193)		III, IV (173/197)		V, VI (304/360)	
Mean outcome scores:	*Raw score*	*z*	*Raw score*	*z*	*Raw score*	*z*
Alcohol consumption [2]	1.08	0.367	0.70	0.169	0.20	—0.323
Alcohol problems	2.38	.535	1.16	.013	.39	—.317
Drug use	2.38	.068	2.47	.117	2.04	—.113
Drug problems	4.45	.163	4.02	.058	3.25	—.133
Dysphoria	23.62	.140	22.75	.053	21.17	—.105
Criminal justice	1.99	.223	1.3	—.091	1.41	—.070
Months employed	3.52	.032	3.3	.073	3.80	—.032
Based on 2 months prior to admission:						
Types (number of cases)	I (97/107)		III (80/88)		II, IV, V, VI (468/555)	
Mean outcome scores:	*Raw score*	*z*	*Raw score*	*z*	*Raw score*	*z*
Alcohol consumption [2]	1.83	0.628	1.26	0.443	0.27	—0.222
Alcohol problems	3.12	.853	1.55	.179	.63	—.217

Drug use	2.57	.166	2.61	.160	2.11	—.072
Drug problems	4.90	.273	3.56	—.056	3.57	—.054
Dysphoria	24.60	.238	22.83	.061	21.66	—.056
Criminal justice	1.82	.138	1.36	—.094	1.53	—.012
Months employed	3.15	.116	3.44	.049	3.72	—.014

Based on followup:

Types (number of cases)	A (90)		C (109)		D, E (443)	
Mean outcome scores:	*Raw score*	*z*	*Raw score*	*z*	*Raw score*	*z*
Drug use	3.39	0.595	2.50	0.129	1.97	—0.150
Drug problems	6.51	.667	3.61	—.047	3.26	—.132
Dysphoria	27.49	.550	20.56	—.142	21.19	—.080
Criminal justice	1.63	.336	1.06	—.013	.93	—.097
Months employed	2.82	.209	4.32	—.126	3.82	—.014

[1] Where 2 Ns are given, the 1st N applies to the 4 drug and alcohol outcome measures, where only subjects at risk for substances abuse (i.e., not in prison) were included.

[2] Alcohol consumption is expressed in the equivalent ounces of whisky. The z scores are based on the index score used in the analyses of data.

Note—Subjects who reported high alcohol problems but not high alcohol consumption were excluded from these analyses. Those excluded from the analyses based on intake data were type VII (N=13/14). Excluded from the analyses based solely on followup data were type B (N=16). The means and sigmas used to obtain the standard scores were based on all cases followed up, however.

All z scores are oriented so that a positive score represents poorer treatment outcome, while a negative score represents superior rehabilitation.

somewhat better outcomes than those of the problem drinkers. The prognosis associated with heavy drinking alone varied somewhat, depending on the specific outcome variable examined.

Heavy drinking prior to treatment without related problems was associated with greater substance use on followup. As regards both alcohol consumption and drug use on followup, pretreatment heavy drinkers had significantly poorer outcomes than did non-heavy drinkers, and did not differ significantly from the problem drinkers. This was true whether the identification of heavy drinking was based on the lifetime history or on drinking current at the time of intake. Thus, level of alcohol consumption prior to treatment was associated with consumption of alcohol and drugs (especially marijuana, but other nonnarcotics as well) on followup, regardless of whether or not problems stemming from that consumption had been reported on intake.

The only outcome measure that was related to problem drinking but not to heavy drinking by itself, was criminal justice involvement. While a history of problem drinking was predictive of greater involvement with the criminal justice system during the followup year, heavy drinking alone predicted no greater involvement than did moderate or no drinking. Heavy drinking was, in fact, associated with the least criminal justice involvement.

Thus, the data demonstrate that, while an intake history of problem drinking is prognostic of the poorest outcomes, even in the absence of reported alcohol problems, heavy drinking is also a danger sign. Heavy drinking in itself is correlated with heavy drinking and drug use a year after intake. The moderate levels of alcohol problems, drug problems, and dysphoria found at 1-year postintake among a significant portion of heavy drinkers may continue to increase as time goes on, in view of the continued drug and alcohol use.

For the clinician who must evaluate a drug addict coming for treatment in order to plan that treatment, a current high level of alcohol consumption is a serious warning sign, the more so if alcohol-related problems are present. The drug addict not currently experiencing trouble with alcohol or drinking to excess who has done so in the past should also be watched carefully for a possible return to problem drinking after treatment has begun. And, finally, regardless of the pretreatment drinking history, the occurrence of problem drinking at any time creates a high risk of treatment failure, as does heavy drinking that may become problem drinking.

PREDICTING OUTCOME ON ADMISSION TO TREATMENT: A MULTIVARIATE APPROACH

The findings reported demonstrated that heavy drinking and problem drinking, both before and after admission to treatment

for drug abuse, would be found to be associated with poorer treatment outcomes. Since certain evidence of significant correlations have surfaced, it was decided to examine, through a multivariate analytical approach, the effect of a series of variables upon treatment outcomes. Through this approach, it may be possible to identify variables at intake that may explain outcome variance.

The method used was stepwise multiple regression analysis, in which a multiple set of independent variables are correlated with each other and with a single dependent variable in order to ascertain how and to what extent the independent variables can best predict the dependent variable in question. The independent variables were 23 measures derived from the intake interview, and each of the 7 outcome measures served, in turn, as the dependent variable.

These analyses tell how much of the variance of each outcome measure can be accounted for by the particular set of intake measures we have used. In this way, they provide a minimal estimate of how well outcome status can be predicted on the basis of information obtained when the person enters treatment. We are also able to determine which intake measures add significantly to our ability to predict each of the outcome measures.

Of the 23 intake measures used, 11 were pretreatment status measures corresponding to the 7 criterion outcome measures. The other 12 measures represent demographic characteristics, personal history and, in 1 instance, current psychological status. A number of other intake measures were considered but not used, either because they were unrelated to any of the outcome measures or because what relationships they did have with outcome measures were already accounted for by variables included in the analysis.[6] The intake measures used in the analyses (followed by the labels used in tables 7, 8, and 9 are--

A. Pretreatment status measures:

1. Lifetime maximum alcohol consumption (LifeAlcUse).

2. Current alcohol consumption in the 2 months prior to admission (CurAlcUse).

3. Lifetime alcohol problems (LifeAlcPr).

[6]Among the intake variables considered were the frequency of use in the 2 months preadmission of each drug category. Whatever ability the drug frequency scores had to predict outcome was better accounted for by #DrugsUse and #DrugsReg which are described below. Frequency of heroin use was nevertheless included in the analysis because of its special importance, but did not turn out to improve prediction of outcome significantly.

4. Current alcohol problems in the 2 months prior to admission (CurAlcPr).

5. Frequency of heroin use in the 2 months prior to admission (Heroin).

6. Number of drugs (other than alcohol) used at all in the 2 months prior to admission (#DrugsUse).

7. Number of drugs (other than alcohol) used regularly in the 2 months prior to admission (#DrugsReg).

8. Lifetime drug problems (DrugProb).

9. Dysphoria, as of the 2 months prior to admission (Dysphoria).

10. Lifetime criminal justice history, based on arrests, convictions, and time spent in prison (CrimHist).

11. Number of months not employed in the 2 years prior to admission (MosUnempl; MosEmploy is used when greater pretreatment employment was associated with poorer outcome status).

B. Other intake variables:

1. Sex, entered as a 2-point measure, with male and female given values of 1 and 2 (Sex).

2. Age (Age).

3. Race, entered as a 2-point measure, with black and other given values of 1 and 2; fewer than 3 percent identified themselves as other than black or white, so most of those classed as "others" were white (Race).

4. Highest grade completed in school (Education).

5. History of disciplinary problems in school, based on report of suspensions, expulsions, and truancy (SchDisc).

6. History of hyperactivity in school, based on report of difficulties in concentration, in sitting still, and talking too much (Hyperact).

7. Parents' socioeconomic status, based on reported occupation of father and/or mother and using the higher status when both were reported (ParSES).

8. Happiness as a child, based on three items: self-rating of happiness, closeness to father, and closeness to mother (HapChild).

9. Report that the subject was abused as a child and/or that someone in the home was violent (Abused).

10. History of complications of drug and/or alcohol abuse, such as accidental or intentional overdose, bad trips, crash, delerium tremens, hepatitis, or cirrhosis (Complic).[7]

11. History of psychiatric hospitalization for a period of at least 2 weeks (PsychHosp).

12. Self-report of alienation, based on two correlated subscales "resistance to authority" and "mistrust" (Alienated).

Tables 7 and 8 each summarize the results of seven multiple regression analyses for the EHRC and methadone samples, respectively. In these tables, the total variance (i.e., R^2) attributable to the intake measures has been partitioned into three components: (a) that accounted for by intake status on the same criterion as the outcome measure in question, (b) that accounted for by the four intake alcohol measures, and (c) that accounted for by the remaining intake measures. For the outcome measures of alcohol consumption and alcohol problems, (a) and (b) are of course the same. In addition, the specific intake measures that best predicted each outcome variable are listed.

Another variable has been added to the intake measures--treatment retention, defined as program completion for EHRC subjects and continuous maintenance for the full year for methadone subjects. Since retention can be considered only after the point of intake, it was taken into the regression equation only after the influence of all 23 intake measures had been extracted.[8] Thus,

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[7] Four of these complications are primarily consequences of drug abuse (accidental overdose, bad trip, hepatitis, and crash); this was verified by the fact that the drug addicts were more than three times as likely to report them as were the alcoholics. Two (delerium tremens and cirrhosis) are symptoms of alcoholism; alcoholics were over eight times as likely to report them as were drug addicts. Intentional overdose was reported equally often by both addiction groups. The two alcoholic symptoms constituted only 3 percent of all complications reported by the drug addicts, so it is safe to consider the Complic score as representing complications of drug abuse for this sample. The percentages of drug addicts reporting each complication were, in order of magnitude: accidental overdose (41 percent of subjects), hepatitis (28 percent), crash (26 percent), bad trip (16 percent), deliberate overdose (7 percent), delerium tremens (2 percent), and cirrhosis (2 percent).

[8] In stepwise multiple regression analysis, one may specify the order in which variables are to be taken. This may be done for various purposes, e.g., to give primacy to certain variables or, as in this case, to reflect the actual sequence of events.

TABLE 7.—*Multiple regression analyses of outcome criterion measures with 23 intake measures and treatment retention as predictors for Eagleville sample*

	Outcome criterion measures=dependent variables						
	Alcohol consumption	Alcohol problems	Drug use	Drug problems	Dysphoria	Criminal justice index	Unemployed
N=	161	161	161	161	206	206	206
R^2=Proportion of variance accounted for by—							
Criterion on intake [1]			[2] 0.0051	0.0057	[3] 0.0193	[2] 0.1667	[4] 0.0415
Alcohol measures [1]	[2] 0.0865	[2] 0.1658	.0252	.0122	.0137	.0167	.0172
Other intake measures [1]	[2].2317	[2].1373	[2].2127	[2].1973	[2].2173	[4].1522	[3].0835
Total: 23 intake measures	[2].3182	[2].3031	[2].2429	[3].2152	[2].2503	[2].3355	.1423
Plus treatment retention	[2].0510	[3].0308	.0147	[2].0714	.0048	[2].1028	[2].0608
Total: 24 measures	[2].3692	[2].3339	[4].2576	[3].2866	[2].2551	[2].4383	[3].1931
R with 23 intake measures	[2].564	[2].551	[2].493	[3].464	[2].500	[2].579	.377
R with 23 intake measures plus treatment retention	[2].608	[2].578	[4].508	[2].535	[2].505	[2].662	[3].439

Independent variables contributing most to prediction, in order:[5]	Sex(M)	CurAlcUse	Complic	SchDisc	Complic	CrimHist	Educ(Low)
	Complic	LifeAlcPr	CrimHist	Abused	Dysphoria	Sex(M)	MosUnempl
	–DrugProb	CrimHist	Hyperact	Heroin	Abused	SchDisc	ParSES(Lo)
	CurAlcPr	CurAlcPr	SchDisc	Hyperact	CurAlcPr	Alienated	SchDisc
	Alienated	Alienated	–LifeAlcPr.	MosEmploy	Hyperact	LifeAlcUse	
	–PsychHosp.	SchDisc	–DrugProb		DrugsUse	Race (B1)	
	CurAlcUse					–PsychHosp	

[1] While a test of significance is available for the R^2 change produced by a single independent variable at the step when it enters the regression, as well as for the total R^2 produced by the set of independent variables from step 1 to any point, we do not know of a test for the significance of the R^2 change produced by a nonsequential set of independent variables. Therefore, where the entry in these rows is based on such a set, the p value is that of single most significant variable in the set. This procedure yields a conservative estimate of the statistical significance of a set of independent variables.

[2] $p < 0.001$

[3] $p < 0.05$

[4] $p < 0.01$

[5] The independent variables listed are those that account for at least 1.7 percent of the variance of the outcome measure for which they are listed. The majority of those listed also added a significant amount of variance at the step when they entered the regression equation. They are listed in the order of magnitude of their contributions to the final regression equation. All labels are oriented so as to indicate the intake status associated with poor outcome status; when necessary, the label is modified to indicate this by a minus sign or other indication. The intake variable(s) corresponding to each outcome measure are enclosed in a box.

NOTE: Listwise deletion was used, so that the analyses included only subjects with no missing data. Some of the items on which intake measures were based were added after the study began, in addition, 10 percent did not report either parent's occupation. As a result 15 percent of EHRC subjects and 29 percent of methadone subjects were dropped from the analyses in tables 7, 8, and 9.

its R^2 tells us how much the fact of treatment retention versus dropping out adds to the prediction of outcome once the knowledge of the person obtained on intake has been taken into account.

Tables 7 and 8 summarize a considerable amount of information and warrant careful study. Rather than repeat in the text what the reader can readily find in the table, we will concentrate on pointing out certain general features, letting the detail emerge from the tables themselves.

Eagleville Sample

Table 7 shows that in the EHRC sample the 23 intake measures predicted variances ranging from 22 percent to 34 percent, for 6 of the 7 outcome criteria. Employment was the only outcome measure not significantly predicted overall, although both pretreatment employment and the set of "other" intake variables did achieve statistical significance.* The average R^2 for the seven outcome criteria is 26 percent of outcome accounted for, which is a substantial amount considering that treatment and other life experiences that would be expected to affect outcome occur after the time of intake. Most predictable from overall intake measures were the two alcohol measures and criminal justice involvement (30 percent to 34 percent), followed by the drug measures and dysphoria (22 percent to 25 percent).

As for the specific predictors of each outcome measure, we see first that the intake alcohol history predicted only the alcohol outcome measures when we control for other features of the intake interview. Dysphoria, criminal justice involvement, and employment were significantly predicted by the corresponding preadmission history. The two drug outcome measures, drug use and drug problems, were not significantly related to either the drug or alcohol intake history. The alcohol measures explained only 3 percent of the variance in drug use and only 1 percent of the variance in drug problems.

Over the total set of outcome measures, the major weight (about two-thirds overall) of prediction was carried by the set identified as "other intake measures." For five of the outcome measures, the "other" variables were responsible for by far the majority of variance accounted for. For the remaining two, alcohol problems and criminal justice involvement, they accounted for close to half. The specific variables predictive of each outcome measure are listed and are of interest for further hypothesis development. It should be noted that the preadmission criterion for each aspect of outcome (indicated by being boxed) was the best predictor in the EHRC sample for only one outcome measure and does not appear at all for the two drug outcome measures.

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*This apparent inconsistency occurs because the criteria for statistical significance increase sharply as the number of predictor variables is increased.

Relationships between stay in treatment and outcome must be cautiously interpreted. It would be jumping to a conclusion to assume that a strong relationship means that staying in treatment was, even in part, responsible for improved outcome. It is entirely possible that poor progress in treatment may lead to premature discharge. Undoubtedly, both phenomena play a part in the relationships between treatment retention and outcome. The improvement in prediction by taking treatment completion into account is, in fact, similar for most outcome measures to that shown in a different form in table 4.

Methadone Sample

The results for the methadone sample, shown in table 8, are somewhat different in their patterning. The average proportion of the variance of the seven outcome measures accounted for by the intake interview is somewhat less than in the EHRC sample--21 percent. For the methadone subjects, however, the outcome measures are sharply divided into two categories. Three of them (dysphoria and the two alcohol measures) were well predicted by the intake data, with from 28 percent to 31 percent of their outcome variance accounted for. The other four measures were less well predicted by outcome with from 12 to 19 percent of outcome variance accounted for.

What is most striking about table 8, in contrast to table 7, is the relative contribution to prediction made by different types of intake variables. As in the EHRC sample, alcohol measures contributed little to explaining variance in drug use and drug problems (27 percent for each). The major contribution to prediction was, for each outcome measure, made by the preadmission variable directly corresponding to it, as can be seen in the listing of independent variables. The "other intake measures" accounted for the minor part of the predicted variance for each outcome measure, in marked contrast to what was found in the EHRC sample.

One might wonder why, in both the EHRC and methadone samples, intake information and, in particular, the corresponding pretreatment status, was least able to predict outcomes in regard to drug use and drug problems--the very symptoms for which our subjects entered treatment. The most likely reason is that this population, by definition, consists entirely of people with high levels of drug use and associated problems on intake to treatment. The limited range of pretreatment variation in drug use and problems thus makes it impossible for these measures to predict very much of the substantial variance in drug use and problems that was seen on followup. In contrast, while all of these drug addicts had presenting problems in one or more areas other than their drug abuse, it was not the same area for all. As a result, there was sufficient pretreatment variation in alcohol consumption, alcohol problems, dysphoria, criminal history, and employment to make these useful variables for the prediction of outcome status.

TABLE 8.—*Multiple regression analyses of outcome criterion measures with 23 intake measures and treatment retention as predictors for methadone sample*

	Outcome criterion measures=dependent variable						
	Alcohol consumption	Alcohol problems	Drug use	Drug problems	Dysphoria	Criminal justice index	Unemployed
N=	330	330	330	330	370	370	370
R^2=Proportion of variance accounted for by—							
Criterion on intake[1]			[2]0.0818	[2]0.0531	[2]0.1897	[2]0.0820	[2]0.1505
Alcohol measures[2]	[2]0.2475	[2]0.2537	.0160	.0202	[2].0461	.0042	.0067
Other intake measures[3]	.0327	[3].0477	.0259	[3].0604	[3].0738	[3].0790	.0314
Total: 23 intake measures	[2].2802	[2].3014	[2].1237	[2].1337	[2].3096	[2].1652	[2].1886
Plus treatment retention	.0008	.0007	[2].0335	[2].0467	.0009	[2].0605	[2].0414
Total: 24 measures	[2].2810	[2].3021	[2].1572	[2].1804	[2].3106	[2].2257	[2].2300
R with 23 intake measures	[2].529	[2].549	[2].352	[2].366	[2].556	[2].406	[2].434
R with 23 intake measures plus treatment retention	[2].530	[2].550	[2].396	[2].425	[2].557	[2].475	[2].480

Independent variables contributing most to prediction, in order [5]:	CurAlcUse LifeAlcPr	CurAlcPr - CurAlcUse LifeAlcPr LifeAlcUse	#DrugReg #DrugUse LifeAlcUse	DrugProb Dsyphoria Age (Yng)	Dysphoria CurAlcPr MosUnempl LifeAlcUse Sex(F)	CrimHist SchDisc Complic	MosUnempl Sex(F)

[1] While a test of significance is available for the R^2 change produced by a single independent variable at the step when it enters the regression, as well as for the total R^2 produced by the set of independent variables from step 1 to any point, we do not know of a test for the significance of the R^2 change produced by a nonsequential set of independent variables. Therefore, where the entry in these rows is based on such a set the p value is that of the single most significant variable in the set. This procedure yields conservative estimate of the statistical significance of a set of independent variables.

[2] $p < 0.001$

[3] $p < 0.01$

[4] $p < 0.05$

[5] The independent variables listed are those that account for at least 1% percent of the variance of the outcome measure for which they are listed. The majority of those listed also added a significant amount of variance at the step when they entered the regression equation. They are listed in the order of magnitude of their contributions to the final regression equation. All labels are oriented so as to indicate the intake status associated with poor outcome status; when necessary, the label is modified to indicate this by a minus sign or other indication. The intake variable(s) corresponding to each outcome measure are enclosed in a box.

The degree of prediction added by knowledge of treatment retention for methadone subjects reveals a striking relationship not found for EHRC subjects. As regards the three measures of outcome found to be most strongly a function of pretreatment status--alcohol consumption, alcohol problems, and dysphoria--there was no effect attributable to treatment retention whatsoever. Taking into account the overall reduction in dysphoria and, to a lesser extent, alcohol consumption (table 3), it is possible to predict fairly well at the time of admission to methadone maintenance both the average level of these measures a year later, as well as the relative standing of an individual within the group, without having to know whether or not the client will remain in treatment.

As regards drug use, drug problems, criminal justice involvement, and employment, however, the situation is quite different. These measures were less well predicted from intake measures, and knowledge of treatment retention added significantly to the prediction of outcome, although the contribution of treatment retention in each case was still weaker than that of the intake data. It should be borne in mind, however, that the mere fact of treatment retention is a crude measure of treatment delivered by the program and received by the client for either EHRC or methadone maintenance.

Table 9 examines in more detail two phenomena that were noted in tables 7 and 8, the fact that the set of independent variables described as "other intake measures" accounted for a much greater portion of outcome variance in the EHRC sample than in the methadone sample, and the fact that the corresponding preadmission criterion measure was the best single predictor of each of the seven outcome variables in the methadone sample, while this was the case for only one outcome measure (the criminal justice index) in the EHRC sample. Table 9 is based on the same stepwise multiple regression analyses that are summarized in tables 7 and 8, but groups the 23 intake measures differently so as to address these issues.

The intake variables are divided into four groups: (1) background, consisting of 10 demographic and early history items (sex, age, race, parents' SES, education, school disciplinary problems, hyperactivity, happiness as a child, history of abuse in childhood, and psychiatric hospitalization); (2) five measures of drug history and status on intake (drug problems, complications of drug use, frequency of heroin use, number of drugs used, and number of drugs used regularly); (3) four measures of alcohol history and status on intake (lifetime and current alcohol consumption, lifetime and current alcohol problems); and (4) four other measures of pretreatment status (criminal history, months of unemployment, dysphoria, and alienation).

The most striking and consistent difference between the EHRC and methadone samples in the predictive power of the four sets of intake variables is that the early background variables played a greater role in the prediction of each outcome variable for EHRC subjects than for methadone subjects, ranging from twice as great

to 24 times as great. The specific demographic and early history variables most predictive of outcome among EHRC subjects varied from one outcome measure to another, as can be seen in the lower portion of table 7.

As regards the sets of intake measures representing drug history, alcohol history, and "other status measures," there are no differences between the two treatment samples that are consistent across the seven outcome measures. Each of these three sets of intake measures, however, includes the specific preadmission criterion measures for two or more outcome measures. When we examined the specific intake measure or measures corresponding to each outcome measure, as is done in the lower portion of each half of table 9, it is apparent that pretreatment status on each criterion variable predicts outcomes much better for methadone subjects than for EHRC subjects. This is true for all but one of the outcome measures, most strikingly for the two drug measures and for dysphoria. Only for the criminal justice index is the pretreatment history a better predictor among EHRC subjects.

For EHRC subjects, then, knowledge of the patient's demographic characteristics and early history on admission to treatment were especially useful in predicting posttreatment outcomes. Additional analyses, not reported here, show that this is true regardless of whether treatment was completed or not; thus, it is unlikely that this phenomenon is a result of the treatment itself. Rather, the kind of drug addict who chooses or is referred to Eagleville is apparently one whose current problems not only have their roots in the past, but are still very much a function of longstanding, unresolved difficulties. We have seen earlier that the EHRC sample included a larger proportion of people with histories of social and psychological instability, and it was there suggested that their referral to an intensive residential program was appropriate. These findings confirm that view, by demonstrating that for these drug addicts the effects of their early backgrounds must be overcome before they can be successfully rehabilitated.

Since treatment outcome for the methadone subjects was a function of early background to only a limited extent, treatment that focuses more on the client's current situation and mode of functioning seems more appropriate for these clients. Furthermore, while outcome was more a function of current status rather than early background, it was not just a continuation of the same behavior. For example, preadmission employment predicted outcome status in regard to alcohol problems, dysphoria, and criminal justice involvement as well as employment, while the criminal justice history predicted alcohol consumption, drug problems, and employment as well as criminal justice involvement. Our data may support the view that counseling in methadone programs may be quite effective for many clients by emphasis on present functioning rather than on early background dynamics.

What do all these findings about the "prediction" of outcome mean to the clinician? In the case of our sample, or in any of its subgroups, less than 25 percent of outcome variance could have

TABLE 9.—*Multiple regression analyses of outcome criterion measures with 23 intake measures as predictors for Eagleville and methadone samples*

	Outcome criterion measures—dependent variables						
	Alcohol consumption	Alcohol problems	Drug use	Drug problems	Dysphoria	Criminal justice index	Unemployment
Eagleville subjects: N=	161	161	161	161	206	206	206
Multiple R	[1]0.564	[1]0.551	[1]0.493	[1]0.464	[1]0.500	[1]0.379	0.377
R^2=Proportion of variance accounted for	.3182	.3031	.2429	.2152	.2503	.3365	.1423
Proportion of variance accounted for by—							
Background	.1580	.0361	.0906	.1270	.0972	.0984	.0643
Drug history	.0509	.0324	.0920	.0409	.1165	.0205	.0170
Alcohol history	.0865	.1658	.0251	.0122	.0137	.0167	.0172
Other status measures	.0229	.0689	.0352	.0351	.0229	.1999	.0432
TOTAL	.3182	.3031	.2429	.2152	.2503	.3355	.1423
Proportion of variance accounted for by corresponding intake variable(s).	.0616	.1424	.0051	.0057	.0193	.1667	.0415
Methadone subjects: N=	330	330	330	330	370	370	370

Multiple R	[1] 0.529	[1] 0.549	[2] 0.352	[2] 0.366	[1] 0.556	[1] 0.406	[1] 0.434
R^2=Proportion of variance accounted for	.2802	.3014	.1237	.1337	.3096	.1652	.1896
Proportion of variance accounted for by—							
Background	.0065	.0115	.0088	.0235	.0397	.0502	.0164
Drug history	.0075	.0089	.0840	.0662	.0038	.0244	.0078
Alcohol history	.2475	.2537	.0160	.0202	.0461	.0042	.0087
Other status measures	.0187	.0273	.0149	.0238	.2200	.0864	.1577
TOTAL	.2802	.3014	.1237	.1337	.3096	.1652	.1886
Proportion of variance accounted for by corresponding intake variable(s)	.2440	.2225	.0818	.0531	.1897	.0820	.1505

[1] $p < 0.001$ (2-tailed).
[2] $p < 0.05$.
[3] $p < 0.01$.

been predicted in advance. But there is another, more important, meaning of these findings for those who provide treatment. Tables 7, 8, and 9 describe pretreatment characteristics of these particular drug addicts that played a part in their treatment outcomes, given the particular treatment that they were offered and able to participate in. Viewed in this way, these findings can be used to improve treatment, by helping us to understand certain differences between treatment populations in the ways they can best be helped.

In a very real sense, the ideal toward which we aspire in designing treatment programs is to reduce the R between intake and outcome variables to zero. This would be the case if it were possible, for each individual who comes to us for help, to achieve successful rehabilitation regardless of his or her past. What we have learned from the multiple regression analyses is that this ideal can be approached only by understanding the part played by the distant or recent past, and by subsequent treatment.

It might seem from tables 7 and 8 that treatment made little difference in outcome, compared with pretreatment characteristics. As has been noted, however, the mere fact of treatment retention provides only a crude and very limited picture of the impact of treatment. In spite of this, for both the EHRC and methadone samples treatment retention accounted for a significant amount of the variance in several outcome measures over and above that accounted for by intake information, adding as much as a third again to the predictive power of the intake interview.

A consideration of many aspects of the intake interview thus not only broadens our understanding of the factors associated with good or poor treatment outcomes in different areas of functioning, but enables us to identify which of the relationships previously seen between the alcohol history and outcome measures are the product of the alcohol history itself and which are produced by other factors.

SUMMARY AND IMPLICATIONS

The research reported here developed out of a concern, both clinical and theoretical, with the issue of alcohol abuse among drug addicts.

In this study two related distinct dimensions of alcohol abuse were operationally defined--alcohol consumption and alcohol-related problems--and predictions specific to each dimension were tested.

Alcohol Abuse--Prevalence and Value for Diagnosis

The first question addressed was that of the prevalence of alcohol abuse among drug addicts. The data confirm that it is indeed prevalent. Using criteria based on a previous treatment population

of seriously advanced alcoholics, it was found that 50 percent of the drug addicts in this study sample had consumed excessive quantities of alcohol at some time in their lives, and 25 percent reported that they had experienced a significant number of alcohol-related problems, i.e., symptoms of alcoholism. The criteria used were stringent, so this must be considered a minimal estimate of the prevalence of problem drinking histories in this population. For example, fully half of the sample reported having had more than one symptom of alcoholism at some time in their lives. In the 2 months before they were admitted to treatment for drug abuse, 25 percent had been drinking heavily, and 14 percent reported a significant number of alcohol-related problems, based on the same stringent criteria. A year later, taking the sample as a whole, the prevalence of heavy drinking and of problem drinking was about the same as before treatment.

Given the fact that alcohol abuse is frequently seen in patients coming to treatment for drug abuse, what are the diagnostic and prognostic implications of either active alcohol abuse or a past history of alcohol abuse? The diagnostic issue was addressed by a thorough examination of other features of the intake history. This revealed that those with a history of problem drinking (i.e., a high level of alcohol-related problems) reported significantly more pathological histories than did other subjects. Their histories were characterized by early trauma, behavioral and emotional disturbance going back to childhood, and antisocial or asocial behavior in the more recent past. Anxiety, depression, and suicidal trends were prominent, and their drug use was based more on psychological needs than was the case with other addicts.

Clearly, a history of problem drinking in a drug addict must be considered a diagnostic indicator that the patient has special treatment needs. These pathological histories identified above, particularly those relating to early experiences, were associated primarily with histories of problem drinking, and not with histories of heavy drinking, per se, in the absence of such problems.

Alcohol Abuse and Outcome

The prognostic implications of a history of alcohol abuse obtained on admission to treatment, as well as the relationships between alcohol abuse at the time of followup and other aspects of rehabilitation observed at the same time, have been addressed. To summarize these findings: poor treatment outcome was most strongly associated with problem drinking at the time of followup, next with problem drinking current at intake, then with a history of problem drinking in the past. As for heavy drinking without reported alcohol problems, a curious reversal of expectation was found. Heavy drinking at the time of followup was not associated with poor outcomes in aspects of functioning other than alcohol use and abuse, while pretreatment heavy drinking did predict poor treatment outcome.

It appears that alcohol-related problems experienced by about half of the heavy drinking drug addicts result in more pervasive difficulties than does heavy drinking in and of itself. In this treatment population, however, heavy drinking at one point in time had a high probability of becoming problem drinking at a later time. If it does, and only if it does, a general failure of rehabilitation is likely.

It should be noted that both of the treatment modalities sampled achieved their primary goal of reducing drug abuse. Furthermore, better outcomes were found in those who remained in treatment longer. Contrary to what one might expect, those with a history of problem drinking were no less likely to remain in treatment. Thus, treatment retention and problem drinking are independent predictors of outcome.

The Predictors of Outcome in Two Treatment Samples

Another issue that was raised had to do with the predictors of outcome and possible differences between the two treatment modalities from which our subjects were drawn. A multiple regression analysis provided some interesting and suggestive information about the pretreatment predictors of outcome. A major finding was that use of alcohol intake measures provided little explanation of outcome variance regarding drug use on followup.

Does Methadone Maintenance Lead to Alcohol Abuse?

The increasing recognition in recent years of a serious alcohol abuse problem among methadone-treated drug addicts has suggested to some the possibility that methadone itself in some way leads to problem drinking, that is, creates alcohol abuse in drug addicts who had not previously had a drinking problem.

The findings of this study make it quite clear that this is not generally the case, although we cannot rule out the possibility that it may occur in rare instances.[10] Most of the methadone clients who had a drinking problem a year after admission to treatment had had such a problem before beginning treatment (as was the case with the EHRC sample). Overall, there was no increase in problem drinking. Furthermore, those who remained

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[10]It is also possible that a 1-year period of followup is too short to observe the effects of methadone on alcohol use and abuse. We have not, however, identified any significant number of cases manifesting the rapid onset of alcoholism in methadone clients described by Bihari (1974). A recent report by Gearing et al. (1976) found the reverse to be the case, that is, that previously reported alcohol problems tended to disappear in patients who remained on methadone maintenance for 4 or more years.

on methadone maintenance the entire year were no more likely to have a drinking problem on followup than were those who received methadone for a shorter time. Such a difference would be expected if the methadone were responsible for the drinking. While a small, though appreciable, minority (18 percent) of those who claimed on intake that they had never drunk excessively or had any problems with alcohol did report excessive drinking on followup, the rate was the same for EHRC as for methadone subjects.

Our data show that the strongest rehabilitative effects of 1 year of methadone maintenance were in the control of narcotic abuse and improved employment. The data point up the need for methadone programs to be aware of the potential of the alcohol abuse problem in patient population and consider methods of addressing this problem.

What Does Alcohol Abuse Mean in a Drug Abuser?

The findings of this study indicate that excessive alcohol consumption and problems symptomatic of alcohol abuse are prevalent in any treatment population. The prevalence of problem drinking in this population was high in comparison to the general population (Cahalan 1970; Barr et al. 1974). Prevalence was high at three points in time--before their addiction to drugs, at the time they entered treatment for drug abuse, and 1 year later.

If one's focus is on the presenting problem of drug abuse, problem drinking may be seen as a complicating problem that must be considered in planning an individual's treatment. The findings confirm the hypothesis that the drug addict with a complicating drinking problem is more difficult to rehabilitate. Problem drinking that is active on admission to treatment for the drug problem is a poor prognostic sign and poses considerable treatment difficulties. Problem drinking in the past history that is not currently active on intake is less of an interference with treatment, but should also be a matter of concern.

In viewing the person's total substance abuse history, problem drinking by drug addicts is the most common type of multiple substance abuse that has been identified in this sample. The findings show that problem drinking drug abusers are more deeply disturbed, and their disturbance can be traced to the earlier periods of life. The involvement of these drug abusers with alcohol is not just another aspect of their substance abuse, but a possible indication of serious and pervasive underlying disturbance. Excessive alcohol consumption coupled with alcohol-related problems, including loss of control over drinking, was found to have more serious implications than excessive consumption without the associated problems. From this broader viewpoint, it is not the problem drinking as such that interferes with treatment, but the underlying pathology that is responsible for both the problem drinking and the treatment difficulties.

This study did not base the identification of problem drinking on the mere consumption of alcohol, but on the existence of alcohol-related problems as well. It was thus possible to differentiate among problem drinkers, heavy drinkers without reported problems, and moderate drinkers or abstainers. The data provide the basis for the same type of analysis of drug abuse, since not only use of drugs, but associated problems and psychological motivations for use were studied as well. These distinctions used in this study should be applied to the abuse of all substances. In this way it will be possible to investigate the relationship between the use and abuse of specific substances, rather than accepting a legal or other definition of drug use as necessarily constituting drug abuse.

The fact that drinking and associated symptoms vary widely among drug addicts enhances the value of the alcohol history as a diagnostic tool. The level of pretreatment heroin use, in contrast to alcohol use, varied little among subjects within this treatment population, and the slight differences that did exist did not predict differences in treatment outcome. Furthermore, pretreatment differences among subjects in their use of sedatives, amphetamines, cocaine, marijuana, and tranquilizers also did not predict differences in rehabilitation on followup.

Thus, alcohol abuse can be a highly meaningful and clinically useful indicator of pervasive problems and special treatment needs of drug clients.

RECOMMENDATIONS FOR TREATMENT

The most obvious recommendation based on the findings of this study is that treatment programs provide a thorough assessment of each perspective patient before a treatment plan is established. Clients at high risk of manifesting drinking problems during and after treatment can be identified at intake in most cases. The intake history must cover not only the consumption of alcohol, but motives for drinking, gains obtained from alcohol, loss of control over drinking, psychological and physiological bad effects from alcohol, and consequences in the person's life of his drinking. It is necessary to ascertain what alcohol does for and to the person.

Inquiry should be made about drugs as well as alcohol, and about many other features of the person's history and current functioning. The data show that depression and criminality are of special diagnostic significance in treatment planning. Since there is a high incidence of depression and suicide in this population, it is essential to identify these problems.

Since alcohol abuse on followup is the aspect of outcome most predictable from the intake alcohol history, it is usually possible to identify the patients who most need to be watched for the development of this complicated problem. Future problem drinking

among drug addicts is predicted not only by a past history of problem drinking, but by a history of excessive alcohol consumption as well, even when associated problems have been denied.

In reviewing the intake characteristics of the methadone clients who are in drug-free programs at 1 year and the Eagleville ex-residents who were on methadone maintenance at 1 year, one is struck by the fact that these special subgroups within each treatment modality sample were more like the typical patient in the modality they were in at followup than the typical patient in the modality they first entered. It seems likely that at least some of these individuals would have been more appropriately referred in the first place if (a) a more thorough assessment of their needs had been made at intake and (b) a wider choice of treatment modalities had been available to them.

The data suggests that the needs of the drug addict with a history of problem drinking, as well as the drug addict who is anxious, depressed, or suicidal, may be best met by a comprehensive form of treatment.

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