



## **One-Year Follow-Up After Multimodal Inpatient Treatment for Cocaine and Methamphetamine Dependencies**

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James W. Smith, MD, and P. Joseph Frawley, MD  
Schick Health Services, Seattle, Washington, and Schick Shadel Hospital, Santa Barbara, California

### **Abstract**

*Of a randomly selected sample of 214 patients treated with aversion therapy for cocaine dependence in four chemical dependency units operated by Schick Shadel Hospitals, 156 were followed up 12 to 20 months post-treatment (average 15.2 months). Significant other validation was obtained in 33%. Total abstinence from cocaine for the group overall was 53% at one year post-treatment, and current abstinence of at least 6 months at follow-up was 68.6%. Those treating with aversion for cocaine alone had a one-year abstinence of 39% and a current abstinence of 62.4%. Those treating with aversion for alcohol and cocaine had a one-year total abstinence from cocaine of 69% and a current abstinence of 76%. Those treating with aversion for cocaine and marijuana had a one-year total abstinence from cocaine of 50% and a current abstinence of 65%. Those treating with aversion for alcohol, cocaine, and marijuana had a one-year total abstinence from cocaine of 73% and a current abstinence of 73%. One-year total abstinence from alcohol was 54% for those receiving aversion for both alcohol and cocaine and 77% for those receiving aversion for alcohol, cocaine, and marijuana. Current abstinence from alcohol at follow-up was 68% and 81%, respectively. One-year total abstinence from marijuana was 42% for those treating with aversion for cocaine and marijuana and 64% for those treating with aversion for alcohol, cocaine, and marijuana. Current abstinence at follow-up from marijuana was 61% and 81%, respectively. The use of aversion therapy for both alcohol and cocaine in alcoholics who were also using cocaine was associated with higher total abstinence rates (88% vs. 55%) from cocaine when compared with alcoholics who used cocaine but received no aversion as part of their program. The conclusion is tentative since the follow-up rate in this study was lower than that of the previous study (64% vs. 84%). Being around other users accounted for 49% of relapse situations. Family/Work stress was associated with relapse in 33% of cases and unpleasant feelings in 24% of cases. The use of both reinforcement treatments and the use of support following treatment were associated with improved abstinence rates from cocaine. Those patients who reported losing all urges for cocaine after treatment had a total abstinence from cocaine of 90%, those who reported losing all the uncontrollable urges had a total abstinence of 64%, and those who reported still having the urge reported only 33% total abstinence from cocaine.*

*Keywords-cocaine dependence; aversion therapy; treatment outcome; methamphetamine dependence.*

### **Introduction**

Beginning in the early 1970s, cocaine use and dependence have risen in the United States (Mittleman & Wetli, 1984). Treatment of cocaine dependence has focused on traditional chemical dependency approaches, neurobehavioral approaches, pharmacologic approaches, and others (Rawson, Obert, McCann, & Mann, 1986; Smith, 1986; Kleber & Gawin, 1984a; Gawin et al., 1989a; O'Brien et al., 1988; Washton, 1986).

The Schick Shadel hospitals have provided treatment for alcoholism for over 55 years, using chemical and faradic aversion therapy (Voegtlin & Broz, 1949; Smith & Frawley, 1990). Chemical aversion therapy has been used for

cocaine dependence (Frawley & Smith, 1989) and for marijuana dependence as well (Morakinyo, 1983). Faradic aversion therapy has been used for alcohol (Jackson & Smith, 1978; Cannon, Baker, & Wehl, 1981), marijuana (Smith, Schmeling, & Knowles, 1988), and heroin (Copeman, 1976). This study reports the results of utilizing aversion therapy as part of a multimodal treatment program for cocaine dependence in patients admitted to four private treatment programs operated by Schick Health Services.

## **Methods**

### **Follow Up Methodology**

From those patients who completed at least the initial inpatient treatment for cocaine and/or methamphetamine dependence at four hospital-based Schick Shadel treatment programs, 214 patients were randomly selected. The patients entered treatment from May through November of 1987, and the follow-up was conducted from November 1988 through March 1989. Thus, patients had been out of treatment from 12 to 20 months. The average time for contact was 15.2 months.

It was predetermined that a sample of 214 patients would be selected at random and that every attempt would be made to reach each one. This random sample was selected in the following manner:

Using a table of random numbers, 214 two-digit numbers were selected. These randomly selected numbers were then matched to the last 2 digits of patient case numbers from the universe of patients who were eligible for inclusion in the study.

The 214 patients were systematically telephoned by trained interviewers of Facts Consolidated, an independent research firm, until all the patients had been reached, or until every possible means of reaching them had been exhausted. In cases in which pursuit of the interview would cause a breach of confidentiality, all further attempts to reach that patient were abandoned. This resulted in 125 patients who were interviewed and 89 patients who were not interviewed (58.4% phone contact rate). The protocol also called for a verification interview with a significant other in 33% of cases. All respondents were interviewed over the telephone, in person. Over 1700 actual phone calls were made to reach these 125 patients treating for cocaine/methamphetamine dependence.

The patient records were also reviewed for evidence of relapse following treatment. Thirty-one noncontacted patients who had treated for cocaine or methamphetamine dependence and who had a chart-documented relapse on cocaine, methamphetamine, or other drug for which the patient had sought treatment (e.g., alcohol or marijuana) were also included in the follow-up. This group of contacted ( $n = 125$ ) and chart-documented relapse patients ( $n = 31$ ) comprised a total of 156 individuals, or 72.9% of the total sample.

### **Statistical Methods**

A sample size of 125, when selected in this manner, has a margin for statistical error of 8.93% at the .95 confidence level if it is a sample from a much larger universe. However, since the total universe consists of a finite number of 234, we have applied the Finite Population Correction Factor, and this reduces the error margin to plus or minus 4.18%.

Chi-squared analyses and two-tailed  $t$  tests were utilized to determine statistical significance. A Yates correction was used for chi-squared tests with 1 degree of freedom. A  $p$  value of .05 was considered to be statistically significant.

### **Patient Characteristics**

Table 1 lists the demographics of the patients. The first column includes the patients with either phone follow-up or a chart-documented relapse. This is the group for which outcomes will be reported unless otherwise noted. The second column reports on those patients without any phone follow-up, but will include those who had chart-documented relapses. The third column includes only those patients with neither phone follow-up nor chart-documented relapse.

**TABLE 1 - Demographics of Stimulant Dependent Population**

Variable	#1 Phone + Chart Rel n=156	#2 No Phone F/U n=89	#3 No Phone or Chart Rel n=58	p Value 1v2	p Value 1v3
<b>Marital Status (%)</b>				NS	NS
Married	35	33	38		
Div/Sep	25	30	28		
Single	40	37	35		
<b>Employment (%)</b>				NS	NS
Employed	79	79	86		
Unemployed	17	17	10		
Not Working	4	5	3		
<b>Male (%)</b>	80	76	79	NS	NS
<b>Ethnic Background (%)</b>				NS	NS
Caucasian	66	55	57		
Black	25	37	36		
Hispanic	8	7	5		
Native American	1	1	2		
<b>&lt;30 years old (%)</b>	64	65	62	NS	NS

Note. Percentages rounded to nearest integer.

Approximately 35% were married, 79% were employed, 80% were male, 66% were Caucasian, 64% were under 30 years of age, and 63% lived within 2 hours driving distance of the hospital. There were no significant differences between any of the three groups.

Table 2 lists the information from the drug histories for these patients. The mean Drug Abuse Severity Test Score (DAST) was 6.7 (SD = ± 2). This score indicates moderately severe drug-related problems (Skinner, 1982). On admission, 58% had cocaine in their urine, and 38% had marijuana in their urine; 22% had no drug found in their urine. Only 9.6% of patients used cocaine exclusively, 38.5% used two drugs (including alcohol), 35% used three drugs, and 19% used four or more drugs. Of the 59 patients also treating for alcohol dependence, 69% were daily drinkers and had an average of 8.9 (SD = ± 5.8) years of alcohol-related problems. Of the patients treating for stimulant dependence, 64% described job problems related to drug use, and 47% had marital discord related to drug use; 24% indicated that they had some physical damage from cocaine or methamphetamine. There were no statistically significant differences between the three groups.

Table 3 lists information on patterns of use. Of the 145 patients treating for cocaine dependence, 54.5% snorted cocaine (36.6% exclusively), 46.9% freebased cocaine (30.3% exclusively), and 17.9% used intravenous cocaine (11% exclusively). There were no statistically significant differences between the three groups, except for a greater percentage of exclusive snorters in the contacted group compared to the no phone follow-up group ( $p < .001$ ) or the group with neither phone nor chart follow-up ( $p < .05$ ). For the methamphetamine users, 76.9% snorted the drug, 7.7% smoked it, and 23.1% used it intravenously.

### The Treatment Program

All patients received a complete addiction-focused medical history, physical examination, and laboratory tests, including a urine drug screen. Patients who required detoxification from alcohol were stabilized and off medication before they entered into treatment. The treatment phase lasted 11 to 16 days. Each patient gave informed consent regarding the treatment to be received and alternative treatment (or no treatment) before starting. The treatment consisted of aversion treatments for alcohol, cocaine, methamphetamine, and/or marijuana dependence as determined by the physician to be appropriate in each individual case. Five sodium pentothal treatments were

**Table 2 - Drug Histories and Admission Data**

Variable	#1 Phone + Chart Rel n=156	#2 No Phone F/U n=89	#3 No Phone or Chart Rel n=58	p Value 1v2	p Value 1v3
<b>MAST mean</b>	8	8		NS	
(SD)	9	9			
<b>MASS mean</b>	12	11		NS	
(SD)	13	13			
<b>DAST mean</b>	7	7		NS	
(SD)	2	2			
<b>On Admission (%)</b>					
Urine Coc pos.	58	70	67	NS	NS
Urine Mar pos.	38	39	43	NS	NS
Urine Amphet pos.	6	5	5	NS	NS
Urine Neg.	22	14	14	NS	NS
<b>Number of Drugs (%)</b>					
1 Drug	10	14	10		
2 Drugs	39	36	38		
3 Drugs	35	32	41		
4 Drugs	19	18	14		
<b>Problems Due to Drug Use (%)</b>					
Job Problems	64	70	67	NS	NS
Marital Discord	47	57	60	NS	NS
Withdrawal	18	10	10	NS	NS
Ultimatum from spouse	17	16	19	NS	NS
Arrest for possession	15	11	7	NS	NS
Ultimatum from employer	10	6	5	NS	NS
Arrest for being under drug influence	7	9	10	NS	NS
Physical Damage	24	29	27	NS	NS

Note. MAST, MASS, DAST not available separately for the subgroup with neither phone nor chart follow-up.

Note. Percentages rounded to nearest integer.

usually given on alternate days from the aversion treatment (Smith, Lemere, & Dunn, 1971). In addition, daily educational groups that dealt with various aspects of addiction and recovery were offered in the morning and evening. Patients were exposed to information about specific groups that may be utilized following treatment (e.g., 12-step programs, hospital-sponsored peer or professionally led support groups, and church). Individual counseling was provided to address specific treatment issues such as denial, grief, assertion, resentments, development of a treatment plan, and aftercare planning. Where possible, family members came to the hospital for group education and individual counseling.

### The Aversive Stimulus

The aversion therapy for alcohol and marijuana has been described elsewhere (Smith, 1982; Smith, Schmeling, & Knowles, 1988). The aversion therapy for cocaine is of two kinds. Chemical aversion may be used, in which the nausea caused by oral emetine is associated with the act of snorting the cocaine or methamphetamine (Frawley & Smith, 1990). As an alternative, faradic aversion may be used, which pairs an irritating, but not painful, electric stimulus to the forearm with the act of using, imaging, and preparing to use the cocaine or methamphetamine substitute. The type of procedure depends upon the use pattern of the patient and his or her medical condition.

**Table 3 - Cocaine and Methamphetamine Use Patterns**

Variable	#1 Phone + Chart Rel	#2 No Phone F/U	#3 No Phone or Chart Rel	p Value 1v2	p Value 1v3
<b>Cocaine</b>					
N	145	87	58		
Snort (%)	55	39	41	0.05	NS
Eclusive (%)	37	14	17	0.001	0.05
Freebase (%)	47	59	53	NS	NS
Eclusive (%)	30	38	33	NS	NS
IV (%)	18	26	28	NS	NS
Eclusive (%)	11	16	19	NS	NS
Other (%)	3	7	7	NS	NS
Eclusive (%)	2	5	3	NS	NS
Frequency/Duration Days/mo.	16.8	18.7		NS	
SD	10.7	11			
Years Use	5.2	5.4		NS	
SD	4.5	5			
Amount When Using (gm)					
Average	1.2	1.3		NS	
SD	1.1	1			
Maximum	2.2	2.2		NS	
SD	1.7	1.7			
<b>Methamphetamine</b>					
N	13	3	1		
Snort (%)	77	67	100		
Eclusive (%)	69	67	100		
Smoke (%)	8	0	0		
Eclusive (%)	0	0	0		
IV (%)	23	33	0		
Eclusive (%)	23	33	0		
Other (%)	0	0	0		
Eclusive (%)	0	0	0		
Frequency/Duration Days/mo.	22.2	13.0			
SD	NA	NA			
Years Use	2.6	4.3			
SD	1.6	1.7			
Amount When Using (gm)					
Average	0.9	0.5			
SD	1	1			
Maximum	1.1	1			
SD	1	0.5			

Note. Frequency, duration, and quantity information was not available separately for the subgroup with neither phone nor chart follow-up.  
Note. Percentages rounded to nearest integers except when computing means and standard deviations.

The procedure used for faradic aversion is similar to that used for alcohol treatment (Jackson, & Smith, 1978), nicotine dependence (Smith, 1988), or marijuana (Smith, Schmeling, & Knowles, 1988).

### **The Cocaine or Methamphetamine Substitute**

No cocaine is actually utilized in the treatment, but instead a substitute is used that is similar in appearance and smell and has a numbing effect. In our experience, 2% tetracaine and 1 % quinine in mannitol is an effective substitute for cocaine that is to be snorted. The freebase substitute utilized at the time of the study was either a type of white candy or a white soap which when burned created smoke. For intravenous simulation, a white powder was dissolved by the patient (as part of their standard ritual) and then taken up into a syringe through the needle. No cocaine substitute is actually injected. Instead, the liquid made from dissolving a white powder (D-xylose works best) is pushed out of the syringe just above the forearm where an injection would normally occur. A cocaine scent (Psychem (R), Old Factory, Inc., Atlanta, Georgia) is also applied to the fingers at the time of treatment in order to achieve the odor of “street cocaine” and enhance the association with their cocaine use experience.

A methamphetamine substitute was developed using 1% quinine in mannitol. (This does not burn the nose as much as real crystal methamphetamine does, but we have not yet found a better substitute).

### **Aversive Pairing**

The process for chemical aversion for cocaine or methamphetamine consists of timing the onset of snorting the lines just prior to the onset of nausea. In the first treatment 18 lines may be snorted, while in the last treatment up to 50 lines may be snorted. The snorting continues until all the lines are used. (After the first 4 lines are snorted, the nose is well-numbed and plain mannitol is used for the rest of the lines until the last 4, when the tetracaine-containing substitute is again used.) Usually the patient receives five aversion treatments. However, when a patient is treated with chemical aversion for both alcohol and cocaine, the patient receives the first two aversion treatments for cocaine only, followed by four additional “divided” treatments using both alcohol and cocaine. These last four treatments involve aversion to alcohol in the first part of the session, and the second part focuses the aversion on cocaine. The procedure is discussed more fully elsewhere (Frawley & Smith, 1990).

The faradic aversion to cocaine is always carried out separately from aversion to any other drug. The process consists of pairing the aversive electric stimulus with each link in the chain of behaviors involved in the individual's use of cocaine (e.g., manipulating the paper packet containing the white powder, opening the packet, pouring the powder onto the mirror, cutting it up into lines and snorting the powder). This may include imagery involving the place of usage, actual stimuli associated with usage (e.g., paraphernalia.) Normally, a patient receives five aversion treatments for the cocaine and/or amphetamine dependence. When patients used both methamphetamine and cocaine, treatment addressed both drugs together. Faradic aversion was utilized with 42.3% of the cocaine “snorters,” 90.9% of “freebasers,” and 91.3% of intravenous users. Chemical aversion was utilized for 52.1 % of the cocaine “snorters,” while 5.6% of “snorters,” 9.1 % of “freebasers” and 8.7% of intravenous users received both chemical and faradic aversion. The main reason for these variations was that two facilities were treating “snorters” primarily with chemical aversion and two other facilities were treating “snorters” with primarily faradic aversion. Nearly all “freebase” and “IV” users were started with faradic aversion. In a few cases patients were switched to the alternative treatment modality due to either medical concerns (e.g., chemical aversion inappropriate for a patient) or patient concerns (patient strongly felt that the alternative would be more effective for him or her). Patients treating for alcohol addiction also received five specific aversion treatments for alcohol (chemical or faradic), except as noted above when cocaine and alcohol were being simultaneously treated with chemical aversion. Those receiving aversion treatment for marijuana dependence received five faradic aversions (Smith, Schmeling, & Knowles, 1988.)

The aversion therapy is carried out in a small room which during cocaine or methamphetamine treatment has pictures of white powder or “crack” cocaine and cocaine paraphernalia against a black backdrop and/or actual paraphernalia and piles of white powder or “crack rocks” or methamphetamine substitute visible to the patient.

**TABLE 4 - Patterns of Drug Problems and Percentage of Each Type of Aversion Therapy Practiced**

Variable	#1 Phone + Chart Rel	#2 No Phone F/U	#3 No Phone or Chart Rel	p Value 1v2	p Value 1v3
<b>N</b>	156	89	58		
<b>Cocaine (only)</b>	62 (40%)	53 (60%)	39 (67%)	NS	.05 <sup>a</sup>
Nausea (%)	18	4	5		
Faradic (%)	81	94	95	NS	NS <sup>b</sup>
Both (%)	2	2	0		
<b>Alcohol/Cocaine</b>	37 (24%)	14 (16%)	8 (14%)		
Nausea (%)	51	62	50		
Faradic (%)	41	39	50	NS	NS <sup>b</sup>
Both (%)	8	0	0		
<b>Cocaine/Marijuana</b>	24 (15%)	9 (10%)	5 (9%)		
Nausea (%)	4	0	0		
Faradic (%)	88	100	100	NS	NS <sup>b</sup>
Both (%)	8	0	0		
<b>Alc/Coc/Marijuana</b>	22 (14%)	11 (12%)	6 (10%)		
Nausea (%)	27	35	67		
Faradic (%)	55	41	0	NS	NS <sup>b</sup>
Both (%)	18	24	33		
<b>Crystal Met. (*)</b>	13 (88%)	3 (3%)	1 (2%)		
Nausea (%)	23	0	0		
Faradic (%)	69	100	100	NS	NS <sup>b</sup>
Both (%)	8	0	0		

Note. Percentages rounded to nearest integer.

\* Because of the small number, the methamphetamine cases are lumped together. Two cases of methamphetamine also treated for cocaine in the followed-up group and one in each of the no phone follow-up and the no phone follow-up or chart relapse group.

<sup>a</sup> Chi-squared (4 df)  $p < .05$  for difference in distribution of cocaine diagnoses between the followed-up group and the no phone follow-up or chart relapse group.

<sup>b</sup> Chi-squared (2 df) for difference of aversion modality between Followed-Up Group and No Phone Followed-up or Chart Relapse Group.

The treatment is individualized to each patient and the individual manner in which he or she uses cocaine or methamphetamine. For example, the hospital has a variety of cocaine pipes from which patients may choose, so that the actual experience is as close as possible to what the patient would be doing at home. When possible, the patient is instructed to bring his or her own paraphernalia.

Table 4 summarizes the patients' patterns of alcohol or other drug dependence and the type of treatment received. Data is presented for those followed up by phone or with a chart documented relapse in one column and for those who had no phone follow-up in the second column. The third column contains data from patients with neither phone nor chart follow-up. There were no statistically significant differences between the type of aversive treatment given and the pattern of drug use between the follow-up groups.

### Continuing Care

Patients were instructed to return to the hospital at 2 weeks and 6 weeks following their discharge from initial treatment to receive a reinforcement aversion to each of the drugs for which they had received aversion during the primary treatment, to receive one pentothal treatment, and to have their continuing care plan updated by the counseling staff. Such reinforcement activities have been associated with improved outcome and are strongly encouraged (Smith & Frawley, 1990; Weins & Menustik, 1983.) The aversion treatment provided at each reinforcement is similar to that which they received during the initial treatment. In addition, patients received

**TABLE 5 - Completion of Reinforcement Treatments and Participation in Support Group Activity Following Treatment**

Drug Category*	Number of Reinforcements			
	n	0 (%)	1 (%)	2 (%)
<b>Tot. Phone + Chart Rel</b>	156	18	82	57
Cocaine	69	25	75	52
Alcohol/Cocaine	39	13	87	59
Cocaine/Marijuana	26	15	85	54
Alc/Coc/Marijuana	22	9	91	73
Tot. No Phone F/U	89	27	73	40
Tot. No Phone/Chart Rel	58	21	79	48
<b>p values (x<sup>2</sup>)</b>				
Tot. P + C v No Pa (1 df)		NS	NS	.05
Tot. P + C v No P/Ca (1 df)		NS	NS	NS
C vs AC vs CM vs ACMb (3 df)		NS	NS	NS

  

Drug Category*	n	Support Group Activity During Risk Period				Whole F/U Time	
		12-step (%)	Grad (%)	Church (%)	None (%)	Any (%)	Last 3 months (%)
<b>Tot. Phone F/U</b>	125	36	30	6	38	75	48
Cocaine	54	30	22	5	43	73	50
Alcohol/Cocaine	32	44	38	12	34	81	51
Cocaine/Marijuana	22	41	27	0	32	75	40
Alc/Coc/Marijuana	17	35	41	6	41	71	47
<b>p values (x<sup>2</sup>, 3 df)</b>		27				73	40
C vs AC vs CM vs ACM		NS	NS	NA	NS	NS	NS

\* Cocaine and amphetamine are lumped together in this table due to small number of methamphetamine users.

a P + C = phone and chart follow-up; No P = no phone follow-up; No P/C = no phone or chart follow up.

b C = cocaine only; AC = alcohol/cocaine; CM = cocaine/marijuana; ACM = alcohol/cocaine/marijuana

periodic calls on a decreasing frequency schedule over a 2-year period following discharge (from the Schick Aftercare Department) to monitor patient's abstinence status and progress on the continuing care plan and to make any needed modifications. They also participate in a variety of support group activities, principally 12-step programs, weekly Schick Graduate groups, and/or their churches.

## Results

Outcome data was principally focused on abstinence measures and on participation in follow-up activities.

### Aftercare Activity Participation

Table 5 summarizes the data on completion of reinforcement treatments by each category of patient according to the drug(s) that was (were) treated with aversion. Also included are the utilization of support activity following treatment (based on those with phone follow-up only, since this information could not be obtained from non-contacted patients) during the period of being at risk for relapse. The period of risk is defined as the time prior to their first use of a drug for which they received treatment or, if there was no relapse, the whole follow-up period. The types of support utilized are reported separately. Also reported is whether or not the patient utilized any support at all after treatment (regardless of whether it was initiated before or after a relapse) and whether the patient was using any kind of support in the 3 months prior to follow-up.

This data shows that the majority of patients took both reinforcement treatments. Although over 57% of

patients followed up by either chart or by phone took both reinforcements, only 40.4% of those with no phone follow-up took both ( $p < .05$ ). In those with neither phone follow-up nor chart-documented relapse, the second reinforcement utilization of 48.3% is not statistically different from that of the group with either phone or chart-documented follow-up. The majority of patients with phone follow-up participated in support groups following treatment, with slightly more participating in 12-step groups than in hospital-sponsored groups. Over 40% were still participating in support groups at the time of follow-up over one year later.

### Abstinence From Cocaine and Other Drugs.

Table 6 summarizes the baseline data for different patterns of drug and alcohol problems. The Michigan Alcoholism Screening Test (MAST; Pokorny, Miller, & Kaplan, 1972) and the Missouri Alcoholism Severity Scale (MASS; Evenson, Reese, & Holland, 1982) indicate that those receiving aversion therapy for alcoholism had significant alcohol problems in contrast to those not receiving aversion therapy for alcoholism. Patients receiving aversion for cocaine and marijuana only were less likely to be married and were younger than patients in other groups. Patients treating for alcohol tended not to use as much cocaine on the average as those not receiving

**TABLE 6 - Baseline Demographic and Drug Use Histories**

Baseline Variables	Total*	Cocaine	Alc/Coc	Coc/Mar	ACM	Item	p Value
<b>n</b>	156	69	39	26	22		
Married (%)	35	42	41	15	27	C vs CM	.05
Employed (%)	79	84	77	69	77		NS
Male (%)	79	84	77	69	77		NS
Caucasion (%)	66	59	77	65	68		NS
<30 Y/O (%)	64	67	49	81	64	AC vs CM	.05
MAST mean	8	2	14	6	13	Note 1	
MASS mean	12	1	22	4	20	Note 2	
DAST mean	6	7	6	7	7		NS
Urine Neg (%)	22	25	28	12	14		NS
<b>Cocaine (n)</b>							
Snort (%)	55	40	73	50	68	Note 3	
Freebase (%)	47	53	35	46	50		NS
I.V. (%)	18	19	19	21	9		NS
Ave/Use (gm)	1.2	1.5	0.9	1.3	1	Note 4	
Max/Use (gm)	2.2	2.4	2.1	1.7	2.4		NS
<b>Amphetamine (n)</b>							
Snort (%)	77	86	67	100	0		
Freebase (%)	8	14	0	0	0		
I.V. (%)	23	14	33	0	100		
Ave/Use (gm)	0.9	1.1	0.8	0.3	N/A		
Max/Use (gm)	1.1	1.4	0.9	0.6	N/A		

Note. Percentages rounded to nearest integer except for mean and maximum grams of drug use.

\* Because of the small number of amphetamine patients they are lumped together with the cocaine patients.

Comparisons items and p values ( $\chi^2$ , 1 df).

Note 1:  $p < .001$  for C vs AC, AC vs CM, C vs ACM.  $p < .01$  for CM vs ACM.

Note 2:  $p < .001$  for C vs AC, AC vs CM, CM vs ACM, C vs ACM;  $p < .05$  for C vs CM.

Note 3:  $p < .01$  for C vs AC;  $p < .05$  for C vs ACM.

Note 4:  $p < .002$  for C vs AC;  $p < .05$  for C vs ACM.

aversion for alcohol. There was no statistically significant difference between groups with regard to the percentage with a urine negative for all mood altering chemicals. Table 7 summarizes the results of assessing abstinence from cocaine and any other drugs for which the patient received treatment, as well as abstinence from all mood altering

**TABLE 7 - Abstinence from Cocaine, Alcohol, Marijuana, and Other Non-prescribed Mood-Altering Drugs**

<b>Outcome Variables</b>	<b>Total</b>	<b>Coc</b>	<b>Alc/Coc</b>	<b>Coc/Mar</b>	<b>A/C/M</b>	<b>p Value</b>
	N = 156	n = 69	n = 39	n = 26	n = 22	
F/U percent	73	64	83	83	79	Note 1
<b>Abstinence from Cocaine/Amphetamine:</b>						
1 year (%)	53	39	69	50	73	Note 2
15.2 months (%)	52	38	69	50	68	Note 3
<b>If Relapse, Current Status:</b>						
Used Once (%)	5	9	3	0	5	
Abstain 6 mos. (%)	12	16	5	15	5	
Abstain < 6 mos. (%)	5	7	0	12	0	
Still Using (%)	26	30	23	23	23	NS
<b>Abstinence from alcohol and all drugs except those prescribed by a physician:</b>						
1 year (%)	31	28	44	19	32	NS
15.2 months (%)	29	28	36	19	32	NS
<b>For Those Treating for Alcohol Dependence:</b>						
n	61		39		22	
Abstain 1 year (%)	62		54		77	NS
Abstain 15.2 months (%)	56		44		77	Note 4
<b>If Relapse, Current Status at Follow-Up:</b>						
Used Once (%)	13		18		5	
Abstain 6 mos. (%)	5		8		0	
Abstain < 6 mos. (%)	7		8		5	
Still Using (%)	20		23		14	NS
<b>For Those Treating for Marijuana Dependence:</b>						
n	48			26	22	
Abstain 1 year (%)	52			42	64	NS
Abstain 15.2 months (%)	52			42	64	NS
<b>If Relapse, Current Status at Follow-Up:</b>						
Used Once (%)	2			4	5	
Abstain 6 mos. (%)	15			15	14	
Abstain < 6 mos. (%)	2			4	0	
Still Using (%)	27			35	18	NS
<b>Abstinence from all treated drugs:</b>						
n	125	54	32	22	17	
F/U (%)	49	50	68	71	61	
Abstain 15.2 mos. (%)	44	48	44	32	47	

p Values for Comparisons ( $\chi^2$ , 1 df):

Note 1:  $p < .05$  for C vs AC.

Note 2:  $p < .01$  for C vs AC, C vs ACM.

Note 3:  $p < .01$  for C vs AC.  $p < .05$  for C vs ACM.

Note 4:  $p < .05$  for AC vs ACM.

drugs except those prescribed by a physician. Total abstinence from cocaine for the 15.2 months' follow-up period was achieved by 51.9% of the patients. The abstinent rates from cocaine were significantly better in those treating for both alcohol and cocaine.

### Comparison With Patients Treated in 1983 Without Aversion for Cocaine

Prior to 1985, patients seeking treatment for alcohol addiction at Schick who had a cocaine problem received aversion for the alcohol problem, but only detoxification, counseling, education, and continued support services for the cocaine problem. While still continuing the counseling services and increasing the focus on drug problems, we have, since that time, instituted an aversion program for cocaine or methamphetamine dependence as described above. Table 8 summarizes data comparing the population of patients treated at one Schick facility in 1983 with those who treated in 1987 at the four facilities included in this study. Of 200 patients treated in 1983, 50 were determined to have used cocaine in the 6 months prior to admission. These patients were determined to have primary alcohol dependence complicated by cocaine use. Detailed quantification of drug use at that time was not available. These patients are now compared with 111 patients treated in 1987 who had the diagnosis of alcoholism and had used cocaine or methamphetamine in the 6 months prior to admission. Of the 111 such patients

**TABLE 8 - Comparison of 1983 and 1987 Schick Patients With Alcohol and Cocaine Problems\***

Baseline Variables	1983 Alcohol+ Coc Use n=42	1987 Alcohol+ Coc Use n=111	1987 Alcohol+ Coc Dep n=32	1987 Alcohol+ Coc/Mar Dep n=17	p Value
F/U percent (%)	84	64	68	61	Note 1
<b>Demographics</b>					
<b>Marital Status</b>					
Married (%)	57	40	47	29	NS
Div/Sep (%)	19	31	22	29	
Single (%)	24	30	31	41	
Male (%)	79	83	78	94	NS
<30 (%)	43	43	44	59	NS
<b>Employment Status</b>					
Employed (%)	90	80	78	77	
Unemployed (%)	2	13	16	18	
Not Working (%)	7	7	6	6	
<b>Alcohol Plus</b>					
1 Drug (%)	31	24	36	0	Note 2
2 Drugs (%)	41	47	48	71	
3+ Drugs (%)	29	21	16	29	
<b>MAST mean</b>					
(SD)		13.0	12.4	11.9	NS
<b>MASS mean</b>					
(SD)		22.4	22.2	20.5	NS
<b>DAST mean</b>					
(SD)		5.4	6.3	7.2	Note 3
		2.5	2.1	1.6	

Note. Percentages rounded to nearest integer.

\* Unless otherwise indicated, there were no statistically significant differences between the 1983 group and the three categories of patients treated in 1987.

Note 1:  $p < .05$  ( $\chi^2$ , 1 df) when comparing the follow-up of the 1983 Alcohol+ Coc Use group with either the 1987 Alcohol + Coc Use group or the Alcohol + Coc/Mar Dependence group, but not the 1987 Alcohol + Coc Dep group.

Note 2: no significant difference ( $\chi^2$ , 1 df) between 1983 Alcohol + Coc Use and 1987 Alcohol + Coc Use or Alcohol + Coc Dep.

Note 3:  $p < 0.001$  ( $\chi^2$ , 1 df) 1987 Alcohol + Coc Use vs. Alcohol + Coc/Mar Dependence.

followed-up by phone, 49 received aversion for cocaine. These 49 patients are divided into two groups: 32 patients who received aversion to both alcohol and cocaine or methamphetamine (AC) and 17 patients who, in addition, received aversion for marijuana dependence (ACM). In order for comparable data to be reported regarding follow-up activities and drug use post treatment in the 1983 and 1987 populations, only the phone follow-up data could be used because charts from 1983 did not record drug use in sufficient detail to make accurate comparisons.

The data in Table 8 indicate that the patients being treated 4 years later were less likely to be married, and more likely to be divorced or single. Fewer of the 1987 patients were employed, and those treating for both marijuana and cocaine were slightly younger than the earlier group. However, these differences are not statistically significant. Within the 1987 group, the DAST scores indicated greater drug problems in those receiving aversion for cocaine than in those simply reporting a history of cocaine use, and the difference was statistically significant when compared with those who received aversion for both cocaine and marijuana. The follow-up in 1983 was significantly ( $p < .05$ ) higher than in 1973. The 1983 population was followed-up at an average of 20.5 months, and the 1987 population was followed-up at an average of 15.2 months post treatment. Table 9 summarizes the information available about continuing care activities.

These data indicate that reinforcement utilization was somewhat better in the 1987 group and that support group utilization was similar in the 1983 and 1987 groups. Table 10 summarizes the outcome data, comparing patients treated in 1983 and those treated in 1987. The results indicate marked improvement in the cocaine and drug

**TABLE 9 - Comparison of 1983 and 1987 Continuing Care Activities in Patients Treating for Alcohol and Cocaine Problems**

Continuing Care Participation	1983 Alcohol+ Coc Use n=42	1987 Alcohol+ Coc Use n=111	1987 Alcohol+ Coc Dep n=32	1987 Alcohol+ Coc/Mar Dep n=17	p Value
<b>Reinforcements</b>	(%)	(%)	(%)	(%)	
0	10	11	10	6	NS
1	90	89	91	94	NS
2	50	68	69	82	Note 1
Any support	74	65	77	71	NS
Prior 3 months	38	41	48	47	NS

Note 1:  $p < .05$  ( $\chi^2$ , 1 df) for Reinforcement #2 utilization comparing 1983 group with the 1987 Alcohol + Coc/Mar Dependence group. These results do not differ significantly from those for all patients admitted, regardless of follow-up status.

**TABLE 10 - Comparison of Treatment Outcomes Pre-aversion and Post-aversion Therapy for Cocaine Dependence**

Outcome Variables	1983 Alcohol+ Coc Use n=42	1987 Alcohol+ Coc Use n=111	1987 Alcohol+ Coc Dep n=32	1987 Alcohol+ Coc/Mar Dep n=17	p Value
<b>F/U (%)</b>	84	64	68	61	Note 1
<b>Alcohol</b>					
Abstain 1 year (%)	71	60	56	71	NS
Abstain to F/U (%)	62	56	44	71	NS
<b>Cocaine</b>					
Abstain to F/U (%)	55	88	84	77	Note 2
<b>All Drugs (exclude alcohol)</b>					
Abstain to F/U (%)	41	73	81	47	Note 3

Note. Percentages rounded to nearest integer.

Note 1:  $p < .05$  difference in follow-up between the 1983 group and either the 1987 Alcohol + Coc Use Group or the Alcohol + Coc/Mar Dependence group.

Note 2:  $p < .0001$  difference in abstinence between the 1983 and 1987 Alcohol + Coc Use groups;  $p < .05$  difference between the 1983 group and the 1987 Alcohol + Coc Dependence group.

Note 3:  $p < .001$  1983 Alcohol + Coc Use vs. 1987 Alcohol + Coc Use.  $p < .01$  1983 Alcohol + Coc Use vs 1987 Alcohol + Coc Dep.  $p < .05$  1987 Alcohol + Coc Dep vs 1987 Alcohol + Coc Mar Dependence. (p values for  $\chi^2$ , 1 df).

**TABLE 11 - Demographic Factors Predicting Total Abstinence from Cocaine (mean 15.2 months)**

<b>Baseline Variables</b>	<b>n</b>	<b>Percent Abstinent</b>	<b>p Value</b>
<b>Sex</b>			NS
Male	125	50	
Female	31	61	
<b>Marital</b>			NS
Married	55	58	
Div/Sep	39	49	
Single	62	48	
<b>Employment</b>			NS
Employed	123	55	
Unemployed	27	33	
Stud/H. W.	5	60	
Disabled	1	100	
<b>Ethnic</b>			NS
Caucasian	103	55	
Black	39	41	
Hispanic	12	50	
Native American	2	100	
<b>Age</b>			NS
<30 years old	100	51	
>30 years old	56	54	

Note. Percentages rounded to nearest integer

abstinence rates in 1987 when compared to 1983. The increase in improvement in the 1987 group is greater than the decrease in follow-up rate when compared to the 1983 group.

### Predictors of Relapse or Abstinence From Cocaine

Demographic factors such as age, sex, marital status, and employment did not have sufficient statistical power to predict outcome; however, the expected trends of improved outcome with employed and married patients were present as shown in Table 11. Surprisingly, there was no association between outcome and age.

Table 12 summarizes the impact on abstinence from cocaine based upon the drug-using history. The data in Table 12 indicates that there is a tendency for better outcomes for abstinence from cocaine to be associated with worse alcohol problems, especially where cocaine is only one of several drugs used. There is a trend for higher DAST scores to have better outcomes, but this is counteracted by the significantly worse outcomes noted in those patients with higher average or maximum use of cocaine per using day. Snorting cocaine is associated with better outcomes than those for patients who freebase or use it intravenously.

### Post-treatment Factors Associated With Abstinence and Relapse

#### The Effect of Treatment on Urges

Table 13 summarizes the outcome for abstinence from cocaine and all nonprescribed mood altering drugs based on the patient's response to the question, "In your judgement, did the Schick Shadel Alcoholism Treatment Program help you to lose the urge to drink/use?" Patients were then offered the choice of responding: (1) Yes, completely lost all the urges, or (2) Yes, lost all the uncontrollable urges, or (3) No, not at all, still have the urges.

## Effect of Post-treatment Recommended Follow-Up Treatment and Support on Abstinence

There were two main recommendations for patients to follow after discharge. The first was to utilize at least 2 reinforcement treatments, and the second was the utilization of support groups. Table 14 shows the association of each of these with abstinence following treatment.

### Relapse Circumstances for the Cocaine Patient

Patients were asked to report the circumstances surrounding their first drink or use of a treated drug following treatment. Table 15 shows these results. This information emphasizes that the major factor in relapse for the cocaine patient is being around others who are using. That is, interpersonal determinants of relapse (pressure from others to use or being around others who are using at a party or celebrating) are twice as likely to be associated with a relapse as are interpersonal determinants (e.g., unpleasant feelings or family/work stress). This is in marked contrast to relapse in alcoholic patients for whom interpersonal and intrapersonal determinants are of equal importance (Marlatt & Gordon, 1980; Smith & Frawley, 1991).

**TABLE 12 - Drug History Association With Total Abstinence from Cocaine**

Baseline Variables	n	Abstain (%)	p Value ( $\chi^2$ )	Status	Mean Value	SD	p Value (t Score)
<b>MAST</b>			NS	MAST			NS
<9	71	49		Abstain	8.7	8.6	
10-19	21	71		Relapse	7.2	9.2	
>19	16	56					
<b>MASS</b>			NS	MASS			.05
<14	68	52		Abstain	13.5	12.8	
15-24	15	60		Relapse	9.3	13.0	
>24	22	64					
<b>DAST</b>			NS	DAST			NS
1-5	27	48		Abstain	6.8	2.0	
6-8	63	56		Relapse	6.5	2.0	
9-10	22	59					
<b>Frequency of Cocaine Use (days/mo)</b>			NS	Freq. of Coc.			NS
<7	30	63		Abstain	16.7	11.2	
7-19	53	42		Relapse	17.0	10.0	
>19	54	57					
<b>Number of Years of Use (yrs.)</b>			NS	Number of Years			NS
1	23	61		Abstain	5.2	4.1	
2-3	41	46		Relapse	5.7	4.8	
4-6	35	51					
>6	39	54					
<b>Avg. Amount Used per Day (gm)</b>			.05	Avg. gms./Day			.01
0-0.5	44	61		Abstain	1.0	0.8	
.75-1	47	51		Relapse	1.5	1.3	
>1	38	37					
<b>Max. Amount Used per Day (gm)</b>			NS	Max. gms./Day			.05
0-1	47	57		Abstain	1.9	1.4	
1-2	33	58		Relapse	2.5	1.9	
>2	43	40					

**TABLE 12 Continued - Drug History Association With Total Abstinence from Cocaine**

Baseline Variables	n	Abstain (%)	p Value ( $\chi^2$ )	Status	Mean Value	SD	p Value (t Score)
<b>Number of Drugs</b>			.05				
Coc Only	15	20					
Coc + 1	60	52					
Coc + 2	53	59					
Coc + 3	28	57					
<b>Use Pattern</b>			.05				
Snort	80	63					
Freebase	56	43					
IV	25	48					
<b>Diagnosis</b>							
Cocaine	62	37	.01 C vs AC; .05 C vs ACM ( $\chi^2$ , 1 df)				
Alc/Coc	37	70					
Coc/Mar	24	46					
Alc/Coc/Mar	22	68					
Metamphet.	13	62					
<b>Problems</b>							
Job Problems	99	48	NS				
Marital Discord	74	45	NS				
Arrest for Possession	21	48	NS				
Arrest under Influence	11	9	.01 Yes vs No				

Note. Percentages rounded to nearest integer.

## Discussion

The follow-up rate in this study was 72.9%. While this is not as high as in our previous study of cocaine dependence (Frawley & Smith, 1990), there were very few significant differences between the group that was followed up and the group that had either no phone follow-up or no phone or chart follow-up. Except for a greater number of exclusive “snorters” ( $p < .05$ ) and fewer “cocaine-only” patients ( $p < .05$ ) in the followed-up group than in the no follow-up group, no other predictor of cocaine abstinence (e.g., arrest for being under the influence, MASS score, average or maximum amount of cocaine used per day, or number of drugs) was statistically significantly different between those followed up and those with no follow-up. Also, there were no statistically significant difference in reinforcement utilization between the group that was followed-up and those with no phone follow-up or chart-documented relapse.

These results are promising. Given the severity of the cocaine and other drug dependency problems with which the patients presented, the relatively high rates of total abstinence for cocaine (51.9%) at one year follow-up compare favorably with other reports of treatment. It was also notable that there was little fall-off in abstinence beyond the 1-year mark. However, total abstinence from all mood altering drugs, including alcohol, during the entire follow-up period was not achieved by a high percentage of patients. Part of this may be explained by the fact that if patients drank any alcohol following treatment this was considered a use of a mood altering chemical, even though the patient may not have had an alcohol problem and the alcohol use would not be considered anything more than “social drinking.” For those treating for only cocaine or cocaine and marijuana, the MAST/MASS scores were on average 2.3/1.4 and 5.5/3.6, respectively, which indicated minimal, if any, alcohol problems.

The lack of standardized methods of reporting outcome hampered the ability to compare our results with those of other types of programs. Nevertheless, the results in this study compare favorably with those reported by other

**TABLE 13 - The Effect of Treatment on Urges and Abstinence Following Treatment**

Patient Report	n	(%)	12 Mo. Abst. Cocaine		12 Mo. Abst. All non-Rx Chemicals	
			n	(%)	n	(%)
Lost All Urges	31	25	28	90	19	61
Lost Uncontrollable Urges	70	56	45	64	27	39
No, Still Have Urges	24	19	8	33	2	8
Total Phone F/U	125	100				
			p<.001 (x <sup>2</sup> , 2 df)		p<.001 (x <sup>2</sup> , 2 df)	

Note. Percentages rounded to nearest integer.

**TABLE 14 - Impact of Reinforcement Treatment and Support on Abstinence (Mean 15.2 Mos. post Discharge)**

Continuing Care Participation	n	(%)	Abstain Cocaine		Abstain All Chemicals*	
			n	(%)	n	(%)
<b>Reinforcement Pattern</b>						
None	28	18	11	39	7	25
One	39	25	13	33	4	10
Two	82	53	52	63	30	37
>Two	7	5	5	71	4	57
Total	156	100				
(x <sup>2</sup> , 3 df)			p<0.01		p<0.01	
<b>Support Utilization During Period of Risk for Relapse</b>						
12-Step	45	36	33	73	23	51
Schick Grad	37	30	26	70	20	54
Church	8	6	5	63	4	50
Any type	77	62	56	73	42	55
None	48	38	23	48	13	27
Total	125	100				
x <sup>2</sup> , 1 df Any Type vs None			p<0.01		p<0.01	

Note. Percentages rounded to nearest integer.

\* Abstain all chemicals including alcohol (except those prescribed by M.D.)

authors. Kleber and Gawin (1984b) have reported cocaine abstinence rates following treatment of 25% to 40%. Frawley and Smith (1990) reported on 9 patients with cocaine dependence only and 11 patients with alcohol and cocaine dependence. All patients were “snorters,” average age 32, 86% male, 45% married, 85% employed, and 100% Caucasian. Ninety-percent were followed up at 6 and 18 months post-treatment. At 6 months, 56% of the cocaine-only group and 70% of the alcohol/cocaine group were totally abstinent from cocaine, while 78% and 70% had been abstinent for at least 30 days prior to that follow-up point. At 18 months, 38 % of the cocaine-only group and 50% of the alcohol/cocaine group had been totally abstinent since the start of treatment, while 75% of the cocaine-only group and 80% of the alcohol/cocaine group had been abstinent for 30 days prior to the follow-up. Rawson, Obert, McCann, and Mann (1986) reported on 83 patients at an average time of 8 months (range 6-11) who had chosen to enter a structured 6-month outpatient program, a 28-day group counseling inpatient program, or no formal treatment after an initial brief consultation. The population had an average age of 29, 72% were male, 38% were single, 52% were married/separated, 57% were “snorters,” 38% “freebasers,” and 5% were “IV” users. The report does not give information about how many patients were eligible for the study initially but were not followed up. At the time of follow-up, the percentage who had returned to less than once a month or no cocaine use was 53% for untreated, 87% for their outpatient program, and 57% for patients

**TABLE 15 - Impact of Reinforcement Treatment and Support on Abstinence (Mean 15.2 Mos. post Discharge)**

Relapse Stimuli	Cocaine		Any Treated Chemical	
	n	(%)	n	(%)
<b>Total relapsed patients</b>	46	100	70	100
Unpleasant Feelings	11	24	13	19
Family/Work Stress	15	33	17	24
Celebration	6	13	16	23
Pressure from others to use	22	49	32	46
Unknown	13	28	26	37

Note. Numbers add up to more than the total of relapsed patients because some indicated more than one category.

who had participated in an inpatient program. The percentage using alcohol less than once per month or not at all was 65 %, and the percentage using marijuana less than once per month or not at all was 37%. Hazelden (cited in Keskinen, 1987) reported that 25% of their population had cocaine problems. (Over 90% of these were in conjunction with alcohol and other drug problems.) A 6-month followup reported abstinence from alcohol of 76% and from other drugs of 83%. Twelve-month abstinence rates from alcohol and drugs are 62% and 66%, respectively (Hyman, 1987). However, the level of cocaine dependency and manner of use, as well as the follow-up rate and methodology, are uncertain in this latter study. A mail/telephone outcome survey by Summer (1990) of 150 primary cocaine addicts treated in a Minnesota model 28-day substance abuse program provided one-year follow-up on 63 patients (42%). Of these, 64% were male, average age 26, 80% Caucasian, 29% “snorters,” 52% “freebasers,” and 19% “IV” users. Approximately 50% of the 63 patients reported abstinence from cocaine. Strickler, Martin, Sowell, and Mooney (1987) reported a 1- 3-year follow-up of cocaine patients treated with a “Minnesota model” program. Of these, 85% were male, average age 31, 45% single, 24% married, 31 % separated/divorced, 82% employed, and 70% Caucasian (but route of use was not specified).

Of the 48 patients who had listed their drug of choice as cocaine at the time of admission, 37 (77%) were followed up. Because the study only focused on patients matched for sex, age, race, and admission date with a primary alcoholic group, data on only 29 of the 37 patients were reported. Total Abstinence from all mood altering chemicals was reported by 48% of the group. An additional 7% had been abstinent for the past 6 months. Washton, Gold, and Pottash (1986) reported on the results of a structured outpatient program for 63 chronic cocaine users. All patients were employed, 73 % male, average age 31, 94% Caucasian, 63% “snorters,” 33% “freebasers,” and 5% “IV” users. Forty-seven were direct admissions to the outpatient program, but 16 had completed 4-10 weeks of an inpatient program before starting the outpatient program for aftercare treatment. The program duration was initially contracted to be 6 months, and 67% completed at least 6 months of treatment. At 7-19 months followup, 51 (81 %) of the 63 patients were currently abstinent. About half of these patients had reported 1 or 2 “slips” during the course of treatment. Because of the great variation in reporting methodology across studies, comparisons with regard to efficacy are difficult. The two outpatient programs did not report total abstinence rates, while the three inpatient programs (as well as our study) do so. One of the outpatient program’s results included patients who had received inpatient treatment prior to entry. Efforts are now underway to help standardize the method of reporting outcome from chemical dependency treatment (Longabaugh, 1990).

Schick Shadel hospitals began to treat specifically for cocaine dependence in 1985, following requests for such treatment from patients and follow-up studies indicating increasing percentages of patients with cocaine dependency. The results of this study suggest that the addition of a cocaine-/methamphetamine-specific program that includes counterconditioning has improved the total abstinence rates from cocaine/methamphetamine (88.3% vs. 54.8%) in patients treating for alcohol complicated by a stimulant problem. However, this conclusion must be tempered because of the lower follow-up rate in the latter study. Nevertheless, the patients in the latter group were less likely to be married (57% vs. 40%) and less likely to be employed (90% vs. 80%) than in the earlier study. Although these differences were not statistically significant, this combination of factors usually is associated with a poorer prognosis.

This study indicates that those with the heaviest drug intake did more poorly than those with lighter intake. At the time these patients were in treatment there was no consistent pharmacologic support such as bromocriptine, amantadine, or desipramine being given that could assist them by mitigating the most severe neurotransmitter disturbances (Cocores, Gold, & Pottash, 1989; Tennant & Sagherian, 1987; Giannini & Billett, 1987; Gawin, Allen, & Humblestone, 1989; Mello, Mendelsohn, Bree, & Lukas, 1989; Dackis & Gold, 1985; Gawin et al., 1989a; Brown, Blum, & Trachtenberg, 1990). Since 1987 when these patients were treated, additional modifications have been made to our treatment programs that have included the addition of some pharmacologic support for abstinence (e.g., amantadine, bromocriptine.)

In the present study, those who “freebased” or used intravenously did more poorly than those who “snorted” cocaine. This finding has been reported by others (Washton & Stone-Washton, 1990). We have made modifications in the stimulus used for the cocaine “rock” used in the treatment of patients who “freebase” cocaine since this study was conducted. We now use benzocaine as the “rock” substitute. Recently a co-worker has suggested that nicotinamide might be a better substitute for methamphetamine (Swanson, J., 1990, personal communication). It remains to be seen whether future studies will be able to demonstrate additional improvements in these groups.

Following treatment, the majority of patients completed two reinforcements that constitute the basic hospital phase of treatment. Increased reinforcement utilization was associated with improved outcome. Support group participation also was associated with improved total abstinence from all drugs for which a patient had treated, as well as from cocaine. These two post-treatment activities (reinforcement utilization and support utilization) have been found to be additive in previous studies of alcohol treatment (Smith & Frawley, 1991). During the period of risk for relapse, over half participated in support group activities of some type. Participation in 12-step groups and Schick Graduate groups were about equal, while a small percentage went to church. At the time of follow-up, 48% were still participating in support activities.

Pressure from others to use was the most important factor associated with relapse to cocaine or any other drug for which the patient had treated. This interpersonal factor in relapse is considerably more prominent in the cocaine patient than the traditional alcohol-dependent patient (Smith & Frawley, 1991; Marlatt & Gordon, 1980). This may be related to the greater dependence on other drug users by the cocaine patient for social support beyond drug use. This, in turn, may be related to the younger age and lower percentage of married patients in the cocaine group resulting in less stable family support for abstinence. In addition, the pyramid-like network of buying, using and selling drugs may isolate cocaine addicts in a different way than that in which alcohol addicts become isolated during the period of use. Other reasons for this might be related to a higher responsiveness to visual cues for drug taking in the drug-dependent group. Smith (1988) reported that the largest factor in predicting outcome from a nicotine dependence program was whether a client returned home to a smoking spouse.

### **Limitations of the Study**

The principal limitations of the study are the lack of a comparison group to which patients were randomly assigned and difficulty in describing the post-treatment environment to which patients return. The lack of objective measures of aversion also limit our ability to determine the relative importance of aversion with respect to other program elements in improving our treatment outcome for cocaine dependence (Cannon, Baker, & Wehl, 1981). Hence the improvements in outcome for the patient with both alcohol and cocaine problems might also be due to changes in staff attitudes, assessment procedures, and other programmatic elements. Standardized methods for the quantification of medication and psychosocial treatment efforts in this field would also be beneficial. The follow-up rate also is not as high as one would like, and there is an excess of primary cocaine dependent patients who freebase or use intravenously in the no-phone or chart follow-up group.

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