

# The Effectiveness of Telephone-Based Continuing Care for Alcohol and Cocaine Dependence

## 24-Month Outcomes

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**Context:** Telephone-based disease management protocols have shown promise in improving outcomes in a number of medical and psychiatric disorders, but this approach to continuing care has received little study in alcohol- and drug-dependent individuals.

**Objective:** To compare telephone-based continuing care with 2 more intensive face-to-face continuing care interventions.

**Design:** A randomized 3-group clinical trial with a 2-year follow-up.

**Setting:** Two outpatient substance abuse treatment programs, one community-based and the other at a Veterans Affairs medical center facility.

**Patients:** Alcohol- and/or cocaine-dependent patients (N=359) who had completed 4-week intensive outpatient programs.

**Interventions:** Three 12-week continuing care treatments: weekly telephone-based monitoring and brief counseling contacts combined with weekly supportive group sessions in the first 4 weeks (TEL), twice-weekly cognitive-behavioral relapse prevention (RP), and twice-weekly standard group counseling (STND).

**Main Outcome Measures:** Percentage of days abstinent from alcohol and cocaine, total abstinence from alcohol and cocaine, negative consequences of substance

use, cocaine urine toxicological results, and  $\gamma$ -glutamyltransferase.

**Results:** Participants in TEL had higher rates of total abstinence over the follow-up than those in STND ( $P < .05$ ). In alcohol-dependent participants, 24-month  $\gamma$ -glutamyltransferase levels were lower in TEL than in RP ( $P = .005$ ). In cocaine-dependent participants, there was a significant group  $\times$  time interaction ( $P = .03$ ) in which the rate of cocaine-positive urine samples increased more rapidly in RP as compared with TEL. On percentage of days abstinent or negative consequences of substance use, TEL did not differ from RP or STND. Participants with high scores on a composite risk indicator, based on co-occurring alcohol and cocaine dependence and poor progress toward achieving intensive outpatient program goals, had better total abstinence outcomes up to 21 months if they received STND rather than TEL, whereas those with lower scores had higher abstinence rates in TEL than in STND ( $P = .04$ ).

**Conclusions:** Telephone-based continuing care appears to be an effective form of step-down treatment for most patients with alcohol and cocaine dependence who complete an initial stabilization treatment, compared with more intensive face-to-face interventions. However, high-risk patients may have better outcomes if they first receive group counseling continuing care after completing intensive outpatient programs.

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**A**LCOHOL DEPENDENCE AND drug dependence are now thought to be chronic disorders for many patients who receive formal treatment.<sup>1,2</sup> Because of the relapsing nature of these disorders, some form of continuing care—also referred to as aftercare—is usually recommended following completion of an initial phase of treatment.<sup>3</sup> Despite the potential benefits of continuing care, many substance-dependent individuals either do not attend any continuing care

or stop attending after a relatively small number of sessions.<sup>4-6</sup>

Continuing care protocols that are more flexible and less burdensome than traditional face-to-face counseling sessions may be more attractive to patients and might therefore promote better adherence and improved disease management over time. One such intervention is telephone-based continuing care. The telephone is considered to have a viable therapeutic role in the monitoring and treatment of a number of disorders, including depression, ob-

**Table 1. Characteristics of 359 Participants at Entrance Into Continuing Care\***

Variable	Standard (n = 122)	Relapse Prevention (n = 135)	Telephone (n = 102)	F Test or $\chi^2$	df
Age, mean $\pm$ SD	41.23 $\pm$ 8.30	41.41 $\pm$ 7.95	43.52 $\pm$ 8.59	2.60	2
Female	21 (17.2)	21 (15.6)	20 (19.6)	0.67	2
Education, mean $\pm$ SD	12.57 $\pm$ 1.87	12.24 $\pm$ 1.58	12.28 $\pm$ 1.84	1.26	2
Race				3.41	4
African American	90 (73.8)	105 (77.8)	81 (79.4)		
White	31 (25.4)	28 (20.7)	18 (17.7)		
Other	1 (0.8)	2 (1.5)	3 (2.9)		
Marital status				1.65	4
Currently married	23 (18.9)	21 (15.6)	18 (17.6)		
Separated/divorced/widowed	60 (49.2)	62 (45.9)	51 (50.0)		
Never married	39 (32.0)	52 (38.5)	33 (32.4)		
Current cocaine dependence	92 (74.2)	101 (74.3)	75 (72.8)	0.08	2
Current alcohol dependence	88 (71.0)	111 (81.6)	73 (70.9)	5.18	2
Major depression, lifetime	38 (31.1)	40 (29.6)	30 (29.4)	0.10	2

\*Data are presented as number (percentage) unless otherwise indicated. All comparisons were not significant.

sessive-compulsive disorder, congestive heart failure, and chronic pulmonary disease.<sup>7-14</sup> With addictions, telephone counseling has been effective in smoking-cessation programs.<sup>15,16</sup> However, few studies have been done with patients with alcohol or drug use disorders, and results have been mixed.<sup>17-19</sup>

This study examined the relative effectiveness of telephone-based continuing care for patients with alcohol and/or cocaine dependence who had completed a 4-week intensive outpatient program (IOP). Participants were randomized to a condition that consisted primarily of brief telephone counseling contacts combined with several group support sessions early in the protocol (TEL) or to 1 of 2 comparison conditions: individualized relapse prevention (RP) or standard 12-step-oriented group counseling (STND). Relapse prevention was selected as a comparison condition because it has shown efficacy in numerous research studies.<sup>20-24</sup> Group counseling was selected as a second comparison condition because it is by far the most common approach to continuing care in addiction treatment programs. Therefore, the comparison conditions represented the state of the art in the clinical research field and treatment as usual, respectively. Each continuing care condition was 12 weeks in length, and participants were observed for a total of 24 months.

The primary research question was whether either RP or STND would produce better substance use outcomes than TEL. The 2 face-to-face conditions were not directly compared, as results from several recent studies<sup>24-28</sup> suggested that they would yield similar substance use outcomes. In analyses of data from the first year of the follow-up,<sup>29</sup> the TEL condition did not differ from either RP or STND on percentage of days abstinent, total abstinence, frequency of cocaine use, or cocaine urine toxicological results. However, moderator analyses indicated that patients with high scores on a composite risk indicator measure—which included current dependence on both alcohol and cocaine and failure to achieve therapeutic goals while in the IOP program—had better total abstinence outcomes in STND than in TEL. Conversely, patients with lower scores on this mea-

sure had better total abstinence outcomes in TEL than in STND.<sup>30</sup>

Although these results from the first year of the follow-up provided initial evidence of the equivalence of the telephone-based continuing care intervention with the more intensive interventions, the possibility remained that longer-term outcomes would not be as positive. In this article, data from the entire 2-year follow-up are presented to evaluate longer-term outcomes in the TEL condition, relative to RP and STND. Moderator analyses with the composite risk indicator were also conducted to determine whether the interaction effects in the first year would persist into the second year of the follow-up. The outcomes that were examined were percentage of days of abstinence, total abstinence, negative consequences of substance use, and cocaine urine toxicological results. A biological measure of heavy alcohol use obtained at the end of the follow-up— $\gamma$ -glutamyltransferase (GGT)—was also examined. Finally, the treatment conditions were compared on self-help participation and additional episodes of inpatient and outpatient substance abuse treatment in the second year of the follow-up.

## METHODS

### PARTICIPANTS

The participants were 359 adults with DSM-IV<sup>31</sup> cocaine or alcohol dependence at the time of entrance to treatment who had completed an IOP, were willing to participate in research, and did not have a psychiatric or medical condition that precluded outpatient treatment. Other inclusion and exclusion criteria are described elsewhere.<sup>29</sup> The participants averaged 41.9 years of age, 12.4 years of education, 8.5 years of regular cocaine use, 18.6 years of regular alcohol use, 2.8 prior drug abuse treatments, and 3.5 prior alcohol treatments. The majority of participants were male (82.6%), African American (77.1%), and not currently married (82.6%). Participants were using alcohol or cocaine on 2 of every 3 days during the 4-month period that preceded the IOP. Data on participants in each treatment condition are presented in **Table 1**.

## TREATMENT

Patients participated in an IOP at 1 of 2 sites: a clinical research unit located at a community-based outpatient program or the Philadelphia Veterans Affairs Medical Center. Both programs offered 9 to 10 hours of group therapy per week and were 4 weeks in length. To graduate from the IOP, patients had to attend regularly and achieve a week of urine toxicological examination—confirmed abstinence by the end of the program. Following graduation from the IOP, patients were randomly assigned to 1 of the following 3 treatment conditions, each of which is described in more detail elsewhere.<sup>29,32</sup>

### Standard Continuing Care (STND)

Patients received 2 group therapy sessions per week, which were a combination of addiction counseling and 12-step recovery practices. This condition is typical of aftercare as it is delivered in many outpatient clinics.

### Individualized Relapse Prevention (RP) Continuing Care

Patients received 1 individual RP session, from a protocol developed by Annis and Davis,<sup>33</sup> and 1 group session per week. A treatment manual and a series of structured modules were used to guide within-session activities as well as between-session homework assignments.<sup>34</sup>

### Telephone-Based Continuing Care (TEL)

Patients had 1 initial individual face-to-face session to orient them to the protocol and thereafter completed one 15-minute telephone call per week. A workbook was used to focus and structure these contacts (R. Morrison, MA, RN, J. R. McKay, PhD, unpublished data, 1997). The telephone sessions began with a brief review of progress toward 1 to 2 goals identified in the prior session. Plans for achieving goals over the next week were then discussed, along with any other pressing issues. During the first 4 weeks of treatment, patients were also offered a weekly support group. The main purpose of this group was to ease the transition from clinic-based to telephone-based treatment. The therapists had the option to retain a patient in the group beyond the 4-week period if the patient was at high risk for relapse. Therefore, although the majority of contacts in this condition were made via the telephone, it was a multimodal intervention that also included some face-to-face therapeutic contacts.

### Therapists and Adherence to Treatment Protocols

The 10 therapists who provided the continuing care treatments were all experienced substance abuse counselors. Each condition was delivered by a minimum of 3 therapists at each site. The individual sessions of RP and TEL therapists were audiotaped to monitor adherence to the protocol as described in the manuals. Individual supervision was provided weekly by the study clinical coordinator, who listened to a majority of the audiotapes, and 1 group supervision session was also held each week. Further information on the therapists and adherence is provided elsewhere.<sup>29</sup>

## PROCEDURES

### Recruitment

Participants at the community site (n=188) were recruited through local treatment programs and social service agencies.

These individuals became eligible for the study if they completed the IOP program, met inclusion criteria, and were able to provide cocaine-free urine tests at the end of the IOP. At the Veterans Affairs site, patients in the final week of the 4-week IOP were screened for study eligibility. Patients who met inclusion criteria (n=175) signed informed consent forms and were randomized at the end of the week. The study was approved by University of Pennsylvania and Philadelphia Veterans Affairs Medical Center institutional review boards.

### Generalizability of the Study Samples

There were approximately 1500 telephone inquiries at the community site from prospective participants. Individuals who appeared to meet eligibility criteria were invited for in-person screening, and of these, approximately 25% kept their appointments. The vast majority of individuals who attended these sessions were deemed eligible to participate and entered the IOP. Analyses presented elsewhere<sup>29</sup> indicated that IOP graduates were more likely to be living in halfway houses and less likely to have used cocaine within 2 days of intake than those who did not complete IOP.

At the Veterans Affairs site, 417 patients with alcohol or cocaine use disorders were screened, and of these, 175 (42.0%) were eligible to participate and were enrolled in the study. The most common reasons for failure to enroll in the study were declined participation (96 of 417; 23.0%), psychiatrically unstable (19; 4.6%), outside of the age range (18; 4.1%), referred to a geriatric group (17; 4.1%), intravenous heroin use in the prior year (17; 4.1%), and failure to come to the baseline assessment (14; 3.4%).

### Randomization Procedures

Urn randomization procedures were used at each site.<sup>35</sup> The balancing factors are described elsewhere.<sup>29</sup> Because several of the balancing factors had highly skewed distributions, the randomization did not produce equal sample sizes across the 3 conditions (STND, 122; RP, 135; and TEL, 102).

### Baseline and Follow-Up Assessments

Baseline assessments were started in the last week of IOP, prior to randomization. All patients who completed the first portion of the baseline assessment (ie, prerandomization) were considered to be in the study. The follow-up assessments were conducted at 3, 6, 9, 12, 18, and 24 months postbaseline. The follow-up rates for self-report data were 90% or greater in the first year, 89% at 18 months, and 86% at 24 months. The treatment conditions did not differ on follow-up rates for self-report or urine toxicological data. Assessments were conducted by highly trained and experienced research staff.<sup>29</sup>

## MEASURES

### Psychiatric Diagnoses

The Structured Clinical Interview for the *DSM-IV* was used to assess *DSM-IV* Axis I disorders.<sup>36</sup>

### Problem Severity

The Addiction Severity Index<sup>37</sup> was used to gather information on medical, employment, drug use, alcohol use, legal, family/social, and psychiatric problem severity. The Addiction Severity Index has demonstrated good internal consistency, test-

retest, and interrater reliabilities in different groups of substance abusers.<sup>38,39</sup>

### Composite Risk Indicator Measure

Prior work by our group and others indicated that patients who were dependent on both alcohol and cocaine and those who made little progress toward achieving the primary treatment goals of the IOP were likely to have particularly poor substance use outcomes<sup>30</sup> and might therefore be inappropriate for telephone-based continuing care. To test this hypothesis, we developed a composite risk indicator measure that was composed of the following items: (1) current dependence at entrance to the IOP on both alcohol and cocaine vs dependence on only 1 substance, (2) any cocaine use during the IOP, (3) any alcohol use during the IOP, (4) attendance at fewer than 12 self-help meetings during the IOP,<sup>40</sup> (5) score on the social support measure at the end of the IOP that was below the median in the study sample,<sup>41</sup> (6) abstinence goal at the end of the IOP that was less stringent than total abstinence,<sup>42</sup> and (7) self-efficacy score at the end of the IOP that was less than 80%.<sup>43</sup> The items were all derived from assessment instruments with good reliability and predictive validity. Each item was coded as either 1 (indicating higher risk) or 0. A total score was obtained by summing the scores on all 7 items (mean±SD, 2.50±1.36).<sup>30</sup> Psychometric analyses indicated the 7 items were adequately described by a single factor model. The procedures used to develop this measure, including rationales for the cut points that were used with the continuous measures, are described in detail elsewhere.<sup>30</sup>

### Self-reported Substance Use

Time-line follow-back<sup>44</sup> techniques were used to gather self-reports of alcohol and cocaine use during the 6 months preceding continuing care and the 24-month follow-up period. In studies with alcoholics and drug addicts, there has been good agreement between time-line follow-back data and collateral and biological data.<sup>45-47</sup> The primary outcome measures derived from the time-line follow-back data were percentage of days of abstinence from both alcohol and cocaine and a dichotomous variable representing complete abstinence from both alcohol and cocaine. Both measures were computed for each 3-month segment of the 24-month follow-up.

### Negative Consequences of Substance Use

The Inventory of Drug Use Consequences<sup>48</sup> was used to gather data on negative consequences of alcohol or drug use. The total score was used in the analyses. This measure has good to excellent test-retest reliability.<sup>48</sup>

### Cocaine Urine Toxicological Examination

Urine samples were obtained at each follow-up and tested for the cocaine metabolite benzoylecgonine using either the Enzyme Multiple Immunoassay Test system or fluorescence polarization immunoassay analysis (with quantitative output converted to a dichotomous variable).

### Biological Measure of Heavy Alcohol Consumption

Blood samples obtained at baseline and 24 months were assayed for GGT. Higher scores are typically associated with heavy alcohol consumption.<sup>49</sup> Because procedures for collecting blood samples were not implemented until part way through the study and because of occasional difficulties in getting blood samples

processed, GGT values from both baseline and the 24-month follow-up were available for 148 of 272 participants with alcohol dependence.

### Treatment Services and Self-help Participation

Days of inpatient and outpatient substance abuse treatment during follow-up were obtained from the time-line follow-back data. An 8-item self-report questionnaire was used to assess patients' participation in self-help groups. The measure had good internal consistency, and scores predict subsequent alcohol and cocaine use.<sup>40,50</sup>

## DATA ANALYSES

Mixed-effect regressions (SAS PROC MIXED; SAS Institute, Cary, NC) were used for the analyses with percentage of days abstinent and negative consequences of substance use. The time-line follow-back data were collapsed into a precontinuing care baseline period (6 months, including the IOP) and eight 3-month follow-up periods. Generalized estimating equations were used to analyze the dichotomous total abstinence measure and cocaine urine toxicological results.

Preliminary analyses with each outcome measure indicated that there were significant main effects for current substance dependence diagnosis and site in each analysis (ie, outcomes worse in patients with both alcohol and cocaine dependence and in those at the Veterans Affairs site), but other potential covariates were not significant in any of the analyses.<sup>29</sup> Furthermore, none of the interactions between these variables and treatment approached significance. Therefore, the final models contained main effects for site, baseline percentage of days abstinent (or negative consequences), treatment condition contrasts, the composite risk indicator (which included dual vs single dependence), and time, as well as interactions between the treatment condition contrasts, composite risk indicator, and time. In these models, the time variable tested for changes over the course of the follow-up (ie, from 3 to 24 months).

Potential differences between treatment conditions in treatment services and self-help participation data in year 2 were analyzed with analyses of variance; treatment condition differences in GGT scores at 24 months were examined with analyses of covariance, which controlled for baseline GGT levels. Because the primary research question was whether the TEL condition would be less effective than the 2 face-to-face continuing care conditions, the outcome analyses focused on 2 planned contrasts: STND vs TEL and RP vs TEL.<sup>29,51</sup>

## RESULTS

### COMPARISON OF TREATMENT CONDITIONS AT BASELINE

Participants in the 3 treatment conditions were compared on 21 demographic, diagnostic, treatment, and problem-severity variables assessed at baseline. Only 1 significant difference was observed; at the Veterans Affairs site, Addiction Severity Index legal composite scores were higher in TEL than in the other 2 conditions. There were no significant differences at the community site.<sup>29</sup>

### ATTENDANCE IN CONTINUING CARE

The mean±SD number of continuing care sessions (telephone, group, and individual) received by participants was

**Table 2. Results of Repeated-Measures Outcome Analyses\***

Predictor Variables	Percentage of Days Abstinent		Total Abstinence		Negative Consequences		Cocaine Urine Toxicological Examination	
	T†	P Value	Odds Ratio	P Value	T†	P Value	Odds Ratio	P Value
	Baseline substance use	1.35	.18	1.00	.55	3.22	.001	1.00
Site (1 = community, 0 = Veterans Affairs)	1.87	.06	1.62	.005	-2.60	.009	0.46	<.001
Composite risk indicator	-2.91	.004	0.51	<.001	3.64	<.001	1.20	.46
Time	-1.56	.12	0.95	.046	1.16	.25	0.97	.46
Composite risk indicator × time	0.67	.50	1.02	.08	-1.61	.11	1.01	.47
STND vs TEL contrast (1 = STND, 0 = TEL)								
Treatment	-1.18	.24	0.28	.047	1.80	.07	0.80	.79
Treatment × time	-0.46	.64	1.01	.70	-0.16	.87	1.10	.053
Treatment × risk indicator	1.42	.15	1.61	.04	-1.58	.12	1.10	.75
Treatment × risk indicator × time	-0.55	.58	0.99	.33	0.40	.69	0.97	.08
RP vs TEL contrast (1 = RP, 0 = TEL)								
Treatment	-0.77	.44	0.44	.24	1.23	.22	0.26	.16
Treatment × time	0.45	.65	1.03	.31	-0.78	.43	1.12	.03
Treatment × risk indicator	1.48	.14	1.60	.06	-1.63	.10	1.34	.36
Treatment × risk indicator × time	-1.35	.18	0.97	.04	1.56	.12	0.97	.11

Abbreviations: RP, relapse prevention; STND, standard group; TEL, telephone-based continuing care.

\*Output from mixed-effect regressions (continuous outcome) and generalized estimating equation (dichotomous outcome) analyses. Time effects cover the follow-up period (ie, 3-month to 24-month follow-ups). In the mixed-effect analyses, *df* = 2181 for percentage of days abstinent and 1157 for negative consequences. In the generalized estimating equation analyses, *df* = 1 for both total abstinence and cocaine urine toxicological results.

†T indicates output from *t* tests of each contrast in the models.

14.24±7.90 in STND, 14.36±8.47 in RP, and 10.94±5.92 in TEL. Patients in the TEL condition received an average of 6 telephone contacts, 4 group sessions, and 1 individual orientation session. Notably, 35% of those in TEL attended more than 4 group sessions.<sup>29</sup> On average, patients in TEL received approximately half as much therapeutic contact during continuing care as those in RP or STND (428 minutes vs 861 and 845 minutes, respectively).

#### ANALYSES WITH SUBSTANCE USE OUTCOMES

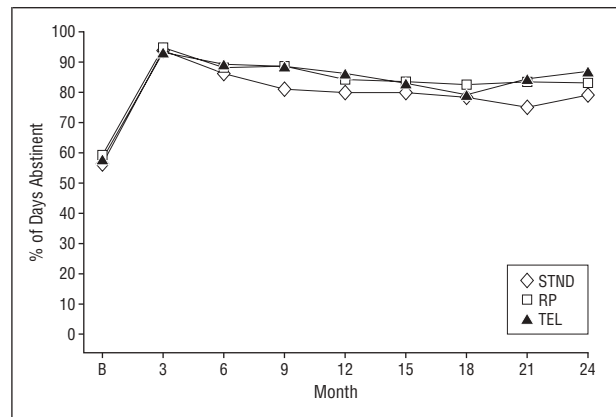
Results from the repeated-measures analyses with the 4 outcome measures are summarized in **Table 2** and presented in **Figures 1** through **5**, which are based on available data (ie, not adjusted for missing data points). Higher scores on the composite risk indicator measure predicted worse outcomes on all 3 self-report measures but not on cocaine urine toxicological results. Rates total abstinence decreased significantly across the follow-ups; however, the other 3 measures did not change during the follow-up.

#### Percentage of Days Abstinent

Data on percentage of days abstinent from alcohol and cocaine (untransformed) within each continuing care condition are presented in Figure 1. Neither the STND vs TEL nor the RP vs TEL contrast was significant. There were also no significant 2- or 3-way interactions between the treatment contrasts, time, and the composite risk indicator.

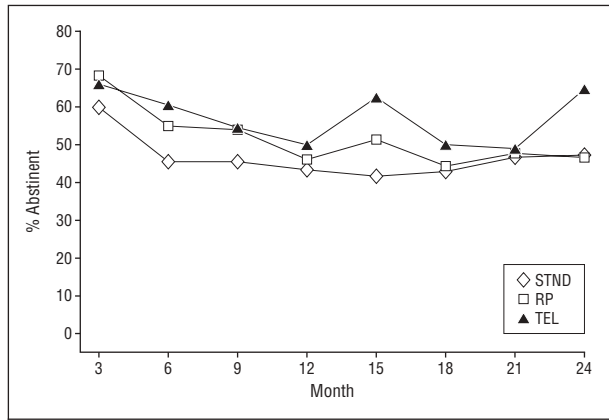
#### Total Abstinence

The percentages of participants in each treatment condition who reported total abstinence from alcohol and cocaine within each 3-month segment of the follow-up are

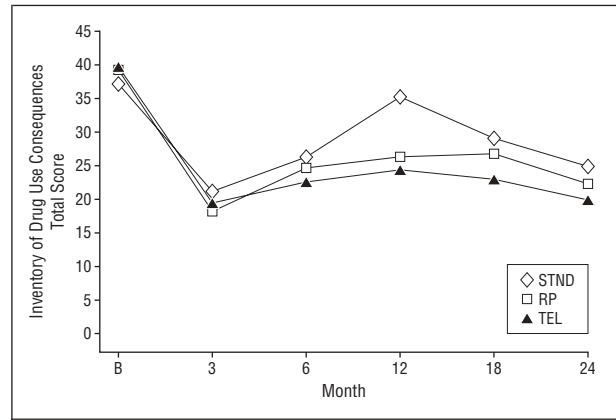


**Figure 1.** Mean percentage of days abstinent at baseline and each 3-month follow-up interval by continuing care condition. The 6-month baseline period includes the 4 weeks of the intensive outpatient program and any treatment received immediately before the intensive outpatient program. There were no significant treatment condition main effects or interactions. B indicates baseline; RP, relapse prevention; STND, standard group; and TEL, telephone-based continuing care.

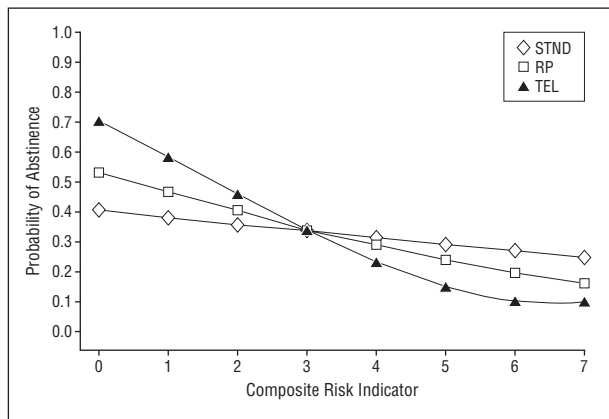
presented in Figure 2. Abstinence rates were significantly lower in STND than in TEL ( $z = -1.98, P = .047$ ). The STND vs TEL contrast × composite risk indicator interaction was also significant ( $z = 2.04, P = .04$ ). Patients with risk indicator scores of 4 or higher had higher abstinence rates in STND than in TEL through month 21 of the follow-up, whereas those with scores of 3 or lower had higher abstinence rates in TEL than in STND. In months 21 to 24, however, abstinence rates were higher in TEL than in STND, regardless of risk indicator score. The interaction effect that was evident through month 21 is illustrated in Figure 3, which presents data from one representative 3-month segment of the follow-up (ie, months 13-15). In the compari-



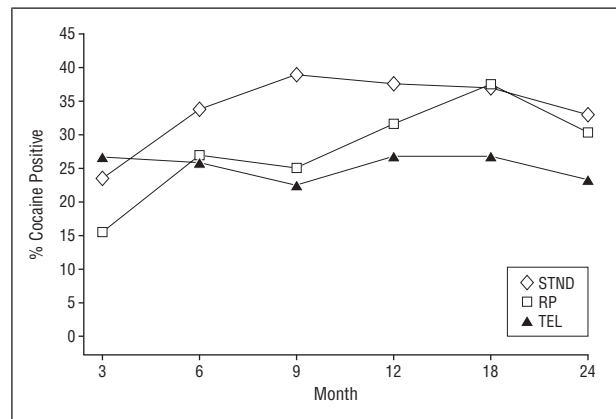
**Figure 2.** Rates of total abstinence from alcohol and cocaine within each of the 3-month follow-up intervals by continuing care condition. The treatment condition main effect was  $TEL > STND$ ,  $P < .05$ . RP indicates relapse prevention; STND, standard group; and TEL, telephone-based continuing care.



**Figure 4.** Mean scores on the negative consequences of substance use measure (Inventory of Drug Use Consequences) at baseline and each follow-up by continuing care condition. There were no significant treatment condition main effects or interactions. B indicates baseline; RP, relapse prevention; STND, standard group; and TEL, telephone-based continuing care.



**Figure 3.** Rates of total abstinence from alcohol and cocaine, as a function of the interaction of continuing care treatment condition and composite risk indicator measure, for months 13 to 15. The treatment condition by risk indicator interactions were  $TEL$  vs  $STND$ ,  $P = .04$ , and  $TEL$  vs  $RP$ ,  $P = .31$ . RP indicates relapse prevention; STND, standard group; and TEL, telephone-based continuing care.



**Figure 5.** Rates of cocaine-positive urine toxicological results at each follow-up by continuing care condition. These analyses were limited to the 268 participants with current cocaine dependence at baseline. Group  $\times$  time interactions were  $TEL$  vs  $RP$ ,  $P = .03$ , and  $TEL$  vs  $STND$ ,  $P = .053$ . RP indicates relapse prevention; STND, standard group; and TEL, telephone-based continuing care.

son of RP and TEL, there was a significant interaction of the treatment contrast, composite risk indicator, and time ( $z = -2.10$ ,  $P = .04$ ). This effect was due to fluctuations over time in the direction of the interaction between the RP vs TEL contrast and the composite risk indicator, and it was therefore not clinically meaningful.

### Negative Consequences of Substance Use

Negative consequence scores (untransformed) are presented in Figure 4. Neither the STND vs TEL nor the RP vs TEL contrast was significant. There were also no significant 2- or 3-way interactions between the treatment condition contrasts, time, and the composite risk indicator in these models.

### Cocaine Urine Toxicological Results in Cocaine-Dependent Patients

These analyses were done with the 268 patients who had current cocaine dependence at entrance to the IOP. Per-

centages of cocaine-positive urine samples within each treatment condition at each assessment point are presented in Figure 5. Neither the STND vs TEL nor the RP vs TEL contrast reached significance. However, the rate of cocaine-positive urine samples increased more rapidly over time in RP compared with TEL ( $z = 2.20$ ,  $P = .03$ ), and a similar trend was obtained in STND compared with TEL ( $z = 1.93$ ,  $P = .053$ ). The 2-way interactions between these treatment contrasts and the composite risk index were not significant, nor were the 3-way interactions that included time.

Finally, GGT data obtained at the 24-month follow-up were examined in patients with alcohol dependence. The analyses indicated that GGT levels (log transformed) were significantly lower in TEL ( $n = 45$ ; mean  $\pm$  SE,  $3.47 \pm 0.10$ ) than in RP ( $n = 48$ ; mean  $\pm$  SE,  $3.86 \pm 0.09$ ) ( $F_{1,90} = 8.45$ ,  $P = .005$ ).  $\gamma$ -Glutamyltransferase levels were also lower in TEL than in STND ( $n = 55$ ; mean  $\pm$  SE,  $3.69 \pm 0.09$ ), but the difference only reached the level of a trend ( $F_{1,97} = 2.76$ ,  $P = .10$ ).

## ADDITIONAL TREATMENT DURING FOLLOW-UP

Participants had a mean  $\pm$  SD of  $3.99 \pm 12.51$  days of inpatient substance abuse treatment during months 13 to 18 and  $4.51 \pm 15.92$  days during months 19 to 24. The treatment conditions did not differ at either time point (13-18 months:  $F_{2,318}=0.42$ ,  $P=.66$ ; 19-24 months:  $F_{2,304}=2.05$ ,  $P=.13$ ). Participants had a mean  $\pm$  SD of  $5.67 \pm 14.23$  days of outpatient substance abuse treatment in months 13 to 18 and  $5.83 \pm 14.11$  days in months 19 to 24. Once again, there were no significant differences between the conditions (13-18 months:  $F_{2,318}=2.07$ ,  $P=.13$ ; 19-24 months:  $F_{2,304}=2.82$ ,  $P=.06$ ). The conditions did not differ on self-help involvement at either 18 months ( $F_{2,291}=0.73$ ,  $P=.49$ ) or 24 months ( $F_{2,294}=2.10$ ,  $P=.13$ ).

### COMMENT

This article presents 24-month outcomes from a randomized study that compared a telephone-based continuing care intervention with 2 more intensive face-to-face interventions in substance-dependent patients who had completed an initial phase of intensive outpatient treatment. Data from the entire follow-up were used to address 2 concerns that were raised in the analyses of the first-year outcomes.<sup>29,30</sup> The first was that outcomes in the telephone-based continuing care intervention might deteriorate faster in the second year, relative to outcomes in the 2 more intensive face-to-face conditions. This was clearly not the case. There were no significant treatment condition  $\times$  time interactions on the 3 self-report outcome measures, and rates of cocaine-positive urine samples actually increased more rapidly during the follow-up in RP than in TEL. The TEL condition also had significantly lower GGT values at 24 months than RP. Finally, when the whole follow-up was considered, TEL produced higher rates of abstinence than STND.

The second concern was that despite the overall good performance of the telephone-based continuing care intervention, there might be some patients for whom this intervention was inadequate, at least as a first step-down treatment. Based on prior research, we hypothesized that patients who were dependent on both alcohol and cocaine and who failed to achieve IOP goals might respond better to more intensive face-to-face treatment than to a telephone-based protocol. These risk factors were operationalized using existing measures with good psychometric properties and combined to form a composite risk indicator. The moderating effect of the composite risk indicator in the comparison of TEL vs STND was significant in the analyses to predict total abstinence and persisted through month 21 of the follow-up. Patients with low to moderate risk scores (eg, 0-3) tended to have better outcomes in TEL than in STND, whereas patients with higher scores tended to have better outcomes in STND than in TEL. It is noteworthy that only 20% of the sample had composite risk indicator scores of 4 or higher.

The study had a number of strengths that increase confidence in the validity and generalizability of the results, including a large sample, 2 sites, manualized treatments, assessment instruments with good psychomet-

ric properties, corroboration of self-reports of alcohol and cocaine use by biological tests, and an excellent follow-up rate. Data on other treatment services received and self-help participation during the follow-up were also gathered to rule out these possible confounding factors. Finally, the participants were typical of patients in publicly funded, outpatient substance abuse treatment programs.<sup>52,53</sup>

With regard to limitations, it is important to stress that the results of the study *do not in any way suggest* that telephone-based interventions will be more effective as an initial approach to the treatment of substance dependence than intensive outpatient treatment, relapse prevention, or group counseling. In that regard, cognitive-behavioral treatments have demonstrated efficacy as an initial treatment in numerous studies,<sup>20,22-24</sup> although there are some studies that find no difference between cognitive-behavioral treatments and other active treatments.<sup>25-28</sup> Another limitation of the study is that it did not include a control condition that provided no continuing care. Therefore, the effectiveness of the telephone-based continuing care intervention relative to no continuing care has yet to be established.

About half of the patients who started treatment in the IOPs did not complete those programs and were therefore ineligible for the continuing care study. Data suggested that IOP graduates were more likely to be in an institutional living arrangement, such as a sober house, than IOP dropouts and were less likely to have used alcohol or drugs in the 2 days preceding entrance into an IOP.<sup>29</sup> Therefore, the participants in the study should be considered as better-prognosis patients who had achieved some initial success in the IOPs. The telephone-based protocol actually included a combination of individual, group, and telephone sessions. Moreover, the number of group sessions was flexible, so that patients who were having difficulties that threatened their continued recovery could remain in the group beyond the 4-week cutoff. In this way, the telephone condition functioned as an adaptive or flexible intervention.<sup>54</sup>

Similar results were generally obtained with the self-report and corroborating data. However, we also repeated the analyses with the total abstinence outcome measure, recoding patients who reported no use but had a cocaine-positive urine sample as nonabstinent at that follow-up. Although there were only a small number of such recodings, the rate was lowest in TEL, followed by RP and STND. These analyses produced results that did not differ from those of the original analyses reported here. Finally, we did not adjust  $\alpha$  levels in the data analyses for the number of tests that were performed. If a somewhat more stringent  $\alpha$  level had been adopted (eg,  $P<.01$ ), the only result that would have been significant was lower GGT levels in TEL relative to RP.

In conclusion, our findings indicate that for most substance-dependent patients who complete an initial stabilization phase of outpatient treatment, telephone-based monitoring and brief counseling appears to be as effective a form of step-down continuing care as more intensive face-to-face treatments. Although formal economic evaluations have not been completed, it is likely that this condition will prove to be cost-effective as well.

The mechanisms of action within the telephone condition are not yet known; however, it may work well for patients who have achieved initial stabilization because it is highly focused, more convenient than face-to-face continuing care, and does not interfere as much with other responsibilities, such as employment and child care.

The telephone may be a particularly effective method for delivering continuing care protocols to patients who have limited access to transportation, or to those with family or work-related responsibilities that preclude regular visits to substance abuse treatment clinics after initial stabilization has been achieved. In addition, telephone-based continuing care interventions with durations of longer than 3 months may lead to further improvements in the management of alcohol and drug use disorders.<sup>55</sup> In this regard, a recent study showed that regular contacts to assess recovery status provided over a 2-year period led to faster re-entry into treatment for patients who had relapsed and less need for further treatment at 24 months, compared with those in the control condition.<sup>56</sup> Furthermore, other continuing care interventions that have yielded significant effects in controlled studies have provided 12 months or more of treatment.<sup>6</sup> Further research is needed to determine whether extended telephone monitoring, with the flexibility to increase the frequency or intensity of treatment when warranted through stepped-care protocols,<sup>57</sup> might be an effective and economical method for further improving the management of substance-dependent individuals over longer periods of time.

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## REFERENCES

- McLellan AT, Lewis DC, O'Brien CP, Kleber HD. Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *JAMA*. 2000;284:1689-1695.
- O'Brien CP, McLellan AT. Myths about the treatment of addiction. *Lancet*. 1996;347:237-240.
- ASAM (American Society of Addiction Medicine). *ASAM PPC-2R-ASAM Patient Placement Criteria for the Treatment of Substance-Related Disorders*. 2nd ed. Rev ed. Chevy Chase, Md: American Society of Addiction Medicine; 2001.
- Donovan DM. Continuing care: promoting the maintenance of change. In: Miller WR, Heather N, eds. *Treating Addictive Behaviors*. 2nd ed. New York, NY: Plenum; 1998:317-336.
- Hawkins JD, Catalano RF. Aftercare in drug abuse treatment. *Int J Addict*. 1985;20:917-945.
- McKay JR. The role of continuing care in outpatient alcohol treatment programs. In: Galanter M, ed. *Recent Developments in Alcoholism, Volume 15: Services Research in the Era of Managed Care*. New York, NY: Kluwer Academic/Plenum; 2001:357-372.
- Baer L, Brown-Beasley MW, Sorce J, Henriques AI. Computer-assisted telephone administration of a structured interview for obsessive-compulsive disorder. *Am J Psychiatry*. 1993;150:1737-1738.
- Baer L, Jacobs DG, Cukor P, O'Laughlen J, Coyle JT, Magruder KM. Automated telephone screening survey for depression. *JAMA*. 1995;273:1943-1944.
- Greist JH, Marks IM, Baer L, Parkin JR, Manzo PA, Mantle JM, Wenzel KW, Spierings CJ, Kobak KA, Dotti SL, Bailey TM, Forman L. Self-treatment for obsessive compulsive disorder using a manual and a computerized telephone interview: a U.S.-U.K. study. *MD Comput*. 1998;15:149-157.
- Jerant AF, Azari R, Nesbitt TS. Reducing the cost of frequent hospital admissions for congestive heart failure: a randomized trial of a home telecare intervention. *Med Care*. 2001;39:1234-1245.
- Osgood-Hynes DJ, Greist JH, Marks IM, Baer L, Hennerman SW, Wenzel KW, Manzo PA, Parkin JR, Spierings CJ, Dotti SL, Vitse HM. Self-administered psychotherapy for depression using a telephone-accessed computer system plus booklets: an open U.S.-U.K. study. *J Clin Psychiatry*. 1998;59:358-365.
- Ries AL, Kaplan RM, Myers R, Prewitt LM. Maintenance after pulmonary rehabilitation in chronic lung disease: a randomized trial. *Am J Respir Crit Care Med*. 2003;167:880-888.
- Roter DL, Hall JA, Merisca R, Nordstrom B, Cretin D, Svarstad B. Effectiveness of interventions to improve patient compliance: a meta-analysis. *Med Care*. 1998;36:1138-1161.
- Wasson J, Gaudette C, Whaley F, Sauvigne A, Baribeau P, Welch HG. Telephone care as a substitute for routine clinic follow-up. *JAMA*. 1992;267:1788-1793.
- Lichtenstein E, Glasow RE, Lando HA, Ossip-Klien DJ, Boles SM. Telephone counseling for smoking cessation: rationales and meta-analytic review of evidence. *Health Educ Res*. 1996;11:243-257.
- Wadland WC, Soffelmayr B, Ives K. Enhancing smoking cessation of low-income smokers in managed care. *J Fam Pract*. 2001;50:138-144.
- Connors GJ, Tarbox AR, Faillace LA. Achieving and maintaining gains among problem drinkers: process and outcome results. *Behav Ther*. 1992;23:449-474.
- Foote A, Erfurt JC. Effects of EAP follow-up on prevention of relapse among substance abuse clients. *J Stud Alcohol*. 1991;52:241-248.
- Hilton ME, Maisto SA, Conigliaro J, McNiel M, Kraemer K, Kelley ME, Conigliaro R, Samet JH, Larson MJ, Savetsky J, Winter M, Sullivan LM, Saitz R, Weisner C, Mertens J, Parthasarathy S, Moore C, Hunkeler E, Hu TW, Selby J, Stout RL, Zywiak W, Rubin A, Zwick W, Shepard D. Improving alcoholism treatment across the spectrum of services. *Alcohol Clin Exp Res*. 2001;25:128-135.
- Carroll KM. Relapse prevention as a psychosocial treatment: a review of controlled studies. *Exp Clin Psychopharmacol*. 1996;4:46-54.
- Carroll KM. *A Cognitive-Behavioral Approach: Treating Cocaine Addiction*. Rockville, Md: National Institute on Drug Abuse; 1998. NIH publication 98-4308.
- Carroll KM, Rounsaville BJ, Nich C, Gordon LT, Wirtz PW, Gawin F. One-year follow-up of psychotherapy and pharmacotherapy for cocaine dependence: delayed emergence of psychotherapy effects. *Arch Gen Psychiatry*. 1994;51:989-997.
- Carroll KM, Fenton LR, Ball SA, Nich C, Frankforter TL, Shi J, Rounsaville BJ. Efficacy of disulfiram and cognitive behavior therapy in cocaine-dependent outpatients: a randomized placebo-controlled trial. *Arch Gen Psychiatry*. 2004;61:264-272.
- Irvin JE, Bowers CA, Dunn M, Wang MC. Efficacy of relapse prevention: a meta-analytic review. *J Consult Clin Psychol*. 1999;67:563-570.
- Project Match Research Group. Matching Alcoholism Treatments to Client Heterogeneity: Project MATCH posttreatment drinking outcomes. *J Stud Alcohol*. 1997;58:7-29.
- McKay JR, Alterman AI, Cacciola JS, O'Brien CP, Koppenhaver JM, Shepard DS. Continuing care for cocaine dependence: comprehensive 2-year outcomes. *J Consult Clin Psychol*. 1999;67:420-427.
- Longabaugh R, Morgenstern J. Cognitive-behavioral coping skills therapy for alcohol dependence: current status and future directions. *Alcohol Res Health*. 1999;23:78-85.
- Morgenstern J, Blanchard KA, Morgan TJ, Lavouvie E, Hayaki J. Testing the effectiveness of cognitive-behavioral treatment for substance abuse in a community setting: within treatment and posttreatment findings. *J Consult Clin Psychol*. 2001;69:1007-1017.
- McKay JR, Lynch KG, Shepard DS, Ratichek S, Morrison R, Koppenhaver J, Pettinati HM. The effectiveness of telephone-based continuing care in the clinical management of alcohol and cocaine use disorders: 12 month outcomes. *J Consult Clin Psychol*. 2004;72:967-979.

30. McKay JR, Lynch KG, Shepard DS, Morgenstern J, Forman RF, Pettinati HM. Do patient characteristics and initial progress in treatment moderate the effectiveness of telephone-based continuing care for substance use disorders? *Addiction*. In press.
31. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC: American Psychiatric Association; 1994.
32. McKay JR, Alterman AI, Cacciola JS, Rutherford MR, O'Brien CP. Group counseling vs individualized relapse prevention aftercare following intensive outpatient treatment for cocaine dependence: initial results. *J Consult Clin Psychol*. 1997;65:778-788.
33. Annis HM, Davis CS. Relapse prevention. In: Hester RK, Miller WR, eds. *Handbook of Alcoholism Treatment Approaches*. New York, NY: Pergamon Press; 1989: 170-182.
34. McKay JR, Feeley M, Annis HM. *Manual for Individualized Relapse Prevention Aftercare*. Philadelphia: University of Pennsylvania; 1993.
35. Wei LJ. An application of an urn model to the design of sequential controlled clinical trials. *J Am Stat Assoc*. 1978;73:559-563.
36. First MB, Spitzer RL, Gibbon M, Williams JBW. *Structured Clinical Interview for DSM-IV Axis I Disorders: Patient Edition (SCID-I/P, Version 2.0)*. New York, NY: Biometrics Research Dept, New York State Psychiatric Institute; 1996.
37. McLellan AT, Luborsky L, Woody GE, O'Brien CP. An improved diagnostic evaluation instrument for substance abuse patients: the Addiction Severity Index. *J Nerv Ment Dis*. 1980;168:26-33.
38. Alterman AI, Brown LS, Zaballero A, McKay JR. Interviewer severity ratings and the composite scores of the ASI: a further look. *Drug Alcohol Depend*. 1994; 34:201-209.
39. McLellan AT, Luborsky L, Cacciola J, Griffith J, Evans F, Barr H, O'Brien CP. New data from the Addiction Severity Index: reliability and validity in three centers. *J Nerv Ment Dis*. 1985;173:412-423.
40. McKay JR, Alterman AI, McLellan AT, Snider E. Treatment goals, continuity of care, and outcome in a day hospital substance abuse rehabilitation program. *Am J Psychiatry*. 1994;151:254-259.
41. Procidano ME, Heller K. Measures of perceived social support from friends and from family: three validation studies. *Am J Community Psychol*. 1983;11:1-24.
42. Hall SM, Havassy BE, Wasserman DA. Effects of commitment to abstinence, positive moods, stress, and coping on relapse to cocaine use. *J Consult Clin Psychol*. 1991;59:526-532.
43. Annis HM, Martin G. *Drug-Taking Confidence Questionnaire*. Toronto, Ontario: Addiction Research Foundation; 1985.
44. Sobell LC, Maisto SA, Sobell MB, Cooper AM. Reliability of alcohol abusers' self-reports of drinking behavior. *Behav Res Ther*. 1979;17:157-160.
45. Maisto SA, Sobell LC, Sobell MB. Comparison of alcoholics' self-reports of drinking behavior with reports of collateral informants. *J Consult Clin Psychol*. 1979; 47:106-122.
46. Ehrman RN, Robbins SJ. Reliability and validity of six-month timeline reports of cocaine and heroin use in a methadone population. *J Consult Clin Psychol*. 1994; 62:843-850.
47. Fals-Stewart W, O'Farrell TJ, Freitas TT, McFarlin SK, Rutigliano P. The timeline follow-back reports of psychoactive substance use by drug-abusing patients: psychometric properties. *J Consult Clin Psychol*. 2000;68:134-144.
48. Tonigan JS, Miller WR. The Inventory of Drug Use Consequences (InDUC): test-retest stability and sensitivity to detect change. *Psychol Addict Behav*. 2002; 16:165-168.
49. Allen JP, Litten RZ, Strid N, Sillanaukee P. The role of biomarkers in alcoholism medication trials. *Alcohol Clin Exp Res*. 2001;25:1119-1125.
50. McKay JR, Merikle E, Mulvaney FD, Weiss RV, Koppenhaver JM. Factors accounting for cocaine two years following initiation of continuing care. *Addiction*. 2001;96:213-225.
51. Rosenthal R, Rosnow RL. *Contrast Analysis: Focused Comparisons in the Analysis of Variance*. New York, NY: Cambridge University Press; 1985.
52. McLellan AT, Weisner C. Achieving the public health potential of substance abuse treatment: implications for patient referral, treatment "matching" and outcome evaluation. In: Bickel W, DeGrandpre R, eds. *Drug Policy and Human Nature*. Philadelphia, Pa: Williams & Wilkins; 1996:310-338.
53. Rounsaville BJ, Petry NM, Carroll KM. Single versus multiple drug focus in substance abuse clinical trials research. *Drug Alcohol Depend*. 2003;70:117-126.
54. Lavori PW, Dawson R, Rush AJ. Flexible treatment strategies in chronic disease: clinical and research implications. *Biol Psychiatry*. 2000;48:605-614.
55. Stout RL, Rubin A, Zwick W, Zywiak W, Bellino L. Optimizing the cost-effectiveness of alcohol treatment: a rationale for extended case monitoring. *Addict Behav*. 1999;24:17-35.
56. Dennis ML, Scott CK, Funk R. An experimental evaluation of recovery management checkups (RMC) for people with chronic substance use disorders. *Eval Program Plann*. 2003;26:339-352.
57. Sobell MB, Sobell LC. Stepped care as a heuristic approach to the treatment of alcohol problems. *J Consult Clin Psychol*. 2000;68:573-579.