

Brief Intervention for Medical Inpatients with Unhealthy Alcohol Use

A Randomized, Controlled Trial

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Background: The efficacy of brief intervention in reducing alcohol consumption is well established for selected outpatients but not for medical inpatients.

Objective: To determine whether brief intervention improves alcohol outcomes in medical inpatients who were identified by screening as having unhealthy alcohol use.

Design: Randomized, controlled trial.

Setting: Medical service of an urban hospital.

Patients: 341 medical inpatients who were drinking risky amounts of alcohol (defined for eligibility as >14 drinks/wk or ≥ 5 drinks/occasion for men and >11 drinks/wk or ≥ 4 drinks/occasion for women and persons ≥ 66 y); 77% had alcohol dependence as determined by the Composite International Diagnostic Interview Alcohol Module.

Intervention: A 30-minute session of motivational counseling given by trained counselors during a patient's hospitalization ($n = 172$) versus usual care ($n = 169$).

Measurements: Self-reported primary outcomes were receipt of alcohol assistance (for example, alcohol disorders specialty treatment) by 3 months in dependent drinkers and change in the mean number of drinks per day from enrollment to 12 months in all patients.

Results: The intervention was not significantly associated with receipt of alcohol assistance by 3 months among alcohol-dependent patients (adjusted proportions receiving assistance, 49% for the intervention group and 44% for the control group; intervention-control difference, 5% [95% CI, -8% to 19%]) or with drinks per day at 12 months among all patients (adjusted mean decreases, 1.5 for patients who received the intervention and 3.1 for patients who received usual care; adjusted mean group difference, -1.5 [CI, -3.7 to 0.6]). There was no significant interaction between the intervention and alcohol dependence in statistical models predicting drinks per day ($P = 0.24$).

Limitations: Baseline imbalances existed between randomized groups. Patients who received usual care were assessed and advised that they could discuss their drinking with their physicians.

Conclusions: Brief intervention is insufficient for linking medical inpatients with treatment for alcohol dependence and for changing alcohol consumption. Medical inpatients with unhealthy alcohol use require more extensive, tailored alcohol interventions.

Ann Intern Med. 2007;146:167-176.

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ClinicalTrials.gov Identifier: NCT00183105.

www.annals.org

Professional organizations recommend that clinicians screen their patients for unhealthy alcohol use (that is, the spectrum from drinking risky amounts to dependence) and conduct a brief intervention when indicated (1, 2). Despite this recommendation and the existence of brief, valid screening tools (3-5), patients with unhealthy alcohol use often are not identified and do not receive timely care.

Although widely recommended, brief intervention has proven efficacy in decreasing alcohol consumption and related consequences only in unhealthy drinkers without alcohol dependence and in outpatient settings (6). Its efficacy among other populations (for example, persons with alcohol dependence) and in inpatient settings remains unclear (7).

Evidence suggests, however, that medical inpatients—a group with a high prevalence of alcohol-related problems—may benefit from brief intervention. Some studies have demonstrated the efficacy of brief intervention in settings similar to medical services in which alcohol-related problems are common and their related consequences are severe (8, 9). Further, brief interventions are well suited to medical services. Patients who otherwise might not seek care are accessible and have time for an intervention. Persons admitted because of an alcohol-related

problem may recognize the link between drinking and hospitalization, thus providing a “teachable moment” (10). Also, busy staff might implement a brief intervention because of its brevity and flexibility.

The unmet need for alcohol screening and intervention and opportunities for implementation underscore the importance of determining the efficacy of brief intervention in medical inpatients with unhealthy alcohol use. In addition, evaluating its effectiveness and practicality in real-world settings is critical to help clinicians make informed decisions when treating their patients (11). Therefore, we conducted a randomized, controlled trial to exam-

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Context

Brief interventions reduce alcohol use in outpatients who drink unhealthy amounts but are not alcohol-dependent. Their effect in medical inpatients is unknown.

Contribution

The authors screened all adult medical inpatients at an urban teaching hospital and randomly assigned 341 risky drinkers to a 30-minute motivational counseling intervention followed by treatment planning or to usual care. By 3 months, the same proportion of patients from both groups had received alcohol assistance, and both groups had reduced their drinking to the same degree.

Cautions

Three quarters of the participants met Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, criteria for alcohol dependence.

Implications

In this well-done study, brief intervention did not affect alcohol-related outcomes in persons who drank unhealthy amounts.

—The Editors

ine whether screening followed by brief intervention would improve alcohol-related outcomes in “typical” medical inpatients (that is, a racially diverse group with a range of unhealthy alcohol use, comorbid conditions, and readiness to change). We hypothesized that screening and brief intervention would lead to the following: receipt of alcohol assistance (for example, specialty treatment) among persons with alcohol dependence and, among all persons decreased alcohol consumption, alcohol-related problems, and health care utilization and improved readiness to change and health-related quality of life.

METHODS**Patients**

As previously described, we recruited patients from the inpatient medical service of a large, urban teaching hospital (12). Trained research associates approached all patients who were age 18 years or older and whose physicians did not decline patient contact. Patients fluent in English or Spanish who gave verbal consent were asked to complete a screening interview to determine eligibility: currently (past month) drinking risky amounts (defined for eligibility as >14 standard drinks/wk or ≥ 5 drinks/occasion for men and >11 drinks/wk or ≥ 4 drinks/occasion for women and persons ≥ 66 years); 2 contacts to assist with follow-up; no plans to move from the area in the next year; and a Mini-Mental State Examination score of 21 or greater (13, 14).

Research associates assessed demographic characteristics and administered the Alcohol Use Disorders Identifi-

cation Test (AUDIT) (15) by interview. To better characterize current alcohol use, they assessed the average numbers of drinking-days per week and drinks consumed on a typical day, and the maximum number of drinks consumed per occasion (16, 17). For the first 7 months of the study, research associates asked these additional questions only to patients with an AUDIT score of 8 or greater (a recommended cutoff for screening) (18). For the remaining 22 months, research associates asked the additional questions to anyone who drank in the past 12 months to maximize identification of drinkers of risky amounts. Lastly, the research associates asked all patients who were drinking risky amounts to describe their readiness to change by using a visual analog scale ranging from 0 to 10 (19).

Enrolled patients provided written informed consent and were compensated for each completed interview. The institutional review board at Boston University Medical Center approved this study. We secured additional privacy protection with a certificate of confidentiality from the National Institute on Alcohol Abuse and Alcoholism.

Assessment at Enrollment

Research associates interviewed patients before randomization to assess the characteristics shown in Table 1. One author reviewed the medical records to determine medical diagnoses (29). Diagnoses of alcohol use disorders were based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (30), and were determined with the Composite International Diagnostic Interview (CIDI) Alcohol Module (31, 32).

Randomization and Intervention

An off-site data management group generated assignments to control and intervention groups by using a permuted block (size 8) randomization procedure stratified by AUDIT score (<12 vs. ≥ 12) and provided us the assignments in sealed opaque envelopes. We used the AUDIT score to stratify because we could not score the CIDI before randomization. After each baseline assessment, research associates opened an envelope and informed the patient of his or her assignment.

Patients in the control group received usual care (that is, they were told the screening results and that they could discuss their drinking with their physicians). Specialists were available by referral. Systematic alcohol screening and brief intervention were not routine at this hospital.

We assigned patients in the intervention group to a 30-minute session of brief motivational counseling (19, 33) conducted by counseling and clinical psychology doctoral students whom we trained and supervised. Sessions were audiotaped and included feedback, an open discussion, and construction of a change plan (Appendix, available at www.annals.org).

Outcomes and Measurements

The first primary outcome was self-reported receipt of alcohol assistance in the past 3 months by patients with

CIDI-determined alcohol dependence. This outcome was measured at the 3-month follow-up visit with a standardized interview based on the Treatment Services Review (34) and Form 90 (35). Assistance included residential treatment, outpatient treatment (for example, specialty counseling or therapy), medications, employee assistance programs, or mutual-help groups (for example, Alcoholics Anonymous).

The other primary outcome was the change in the number of mean drinks per day in the past 30 days from enrollment to 12 months among all patients. We determined consumption with the Timeline Follow-back method (36).

Five secondary consumption outcomes (past 30 days) included changes from enrollment to 12 months in the numbers of heavy drinking episodes (≥ 5 drinks/occasion for men and ≥ 4 drinks/occasion for women and for persons ≥ 66 y) and days abstinent; and the proportions of patients drinking risky amounts (> 14 drinks/wk or ≥ 5 drinks/occasion for men and > 7 drinks/wk or ≥ 4 drinks/occasion for women and persons ≥ 66 y) (37), having 1 or more heavy drinking episodes, and abstaining for all 30 days.

Other secondary outcomes included the changes at 12 months in readiness to change (Taking Steps scale on the Stages of Change Readiness and Treatment Eagerness Scale) (38), alcohol problems (total score on the Short Inventory of Problems) (39), physical and mental health-related quality of life (Physical and Mental Component Summary scale scores on the Short-Form Health Survey) (40), and emergency department visits and days of medical hospitalization (both determined by a standardized interview based on the Treatment Services Review and Form 90) (34, 35).

Follow-up Procedures

Research associates conducted follow-up visits, which included reassessment of most domains covered at enrollment, usually in person and at 3 and 12 months (10% and 13%, respectively, by telephone; similar by randomized group). They performed alcohol breath tests at in-person follow-up visits (41).

Although they were involved in the randomization assignment, research associates were not involved in the intervention. Further, 64% of patients at 3-month follow-up and 85% of patients at 12-month follow-up were interviewed by a different research associate than at baseline.

Statistical Analysis

We analyzed all patients in the groups to which they were randomly assigned. Reported *P* values are 2-tailed and are considered statistically significant if they were less than 0.05. We analyzed data with SAS/STAT software, versions 8.2 and 9.1.3 (SAS Institute, Inc., Cary, North Carolina).

To describe the study sample and to compare groups, we used the chi-square test, Fisher exact test, 2-sample *t* test, and Wilcoxon rank-sum test, as appropriate. For the

primary analyses, we used logistic and linear regression models to analyze dichotomous and continuous outcomes, respectively. A priori, we planned to assess for confounding of clinically important imbalances at baseline. Regression models adjusted for sex, alcohol assistance in the 3 months before enrollment, family history of alcoholism, any drug use, alcohol problem score, alcohol-attributable medical diagnoses, and mean number of drinks per day (for dichotomous consumption outcomes only). For the change in mean number of drinks per day at 12 months, we assessed possible effect modification by CIDI-determined dependence status. We included an interaction term in regression models and planned a stratified analysis if a significant interaction ($P \leq 0.100$) was identified. Post hoc, we tested the association between patient-interventionist sex concordance and the primary outcomes in unadjusted logistic and linear regression models (for dichotomous and continuous outcomes, respectively) only in patients in the intervention group.

We also conducted analyses using longitudinal mixed-effects models (linear for continuous outcomes and nonlinear for dichotomous outcomes), which included patients who may have completed 1 follow-up visit but not the other follow-up visit. Thus, we did not exclude patients with missing data at a single time point. We fit a random intercept model with an unstructured variance-covariance matrix.

We initially planned to enroll and randomly assign 500 persons, assuming that 4% of dependent patients in the control group would receive assistance, that all patients in the control group consumed an average of 2.2 drinks per day, and that withdrawal rates would be 10% and 20% at 3 and 12 months, respectively (42, 43). We estimated that 250 persons per group would allow us to detect an absolute increase in assistance of 12% with 87% power and a decrease of 0.6 drinks per day with 83% power. We repeated power calculations (but did not use a formal reassessment method) after enrolling 300 persons because the observed values of the outcomes and their SDs in the control group differed from those initially assumed, and withdrawal rates at 12 months were lower than anticipated. For the recalculations, we assumed that 40% of dependent patients in the control group would receive assistance, that these patients would consume an average of 6.3 drinks per day, and that the withdrawal rates would be 20% and 25% at 3 and 12 months, respectively. We determined that enrolling 175 persons per group would allow us to detect an absolute increase in assistance of 19% and a decrease in drinking of 2.9 drinks per day, both with 80% power. We decided to end further enrollment for the trial when we reached the new target.

Role of the Funding Sources

The study was supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA RO1 12617) and a General Clinical Research center grant from the National

Table 1. Characteristics at Enrollment of All Study Patients and of the Subgroup with Alcohol Dependence*

Variable	Overall		Patients with Alcohol Dependence	
	Control Group (n = 169)	Intervention Group (n = 172)	Control Group (n = 129)	Intervention Group (n = 132)
Demographic characteristics				
Women, n (%)	59 (35)	40 (23)	45 (35)	31 (23)
Mean age (SD), y	44 (11)	45 (11)	44 (10)	44 (10)
Race/ethnicity, n (%)				
Black	80 (47)	75 (44)	64 (50)	60 (45)
White	66 (39)	67 (39)	46 (36)	49 (37)
Hispanic	13 (8)	17 (10)	11 (9)	13 (10)
Unemployed during the past 3 mo, n (%)	104 (62)	112 (65)	83 (64)	91 (69)
Homeless ≥1 night during the past 3 mo, n (%)	39 (23)	47 (27)	34 (26)	44 (33)
Medical diagnoses				
Principal diagnosis most common at current admission, n (%)†				
Rule out myocardial infarction	30 (18)	31 (18)	26 (20)	22 (17)
Asthma, bronchitis, and COPD	21 (12)	15 (9)	10 (8)	12 (9)
Pancreatitis	13 (8)	20 (12)	13 (10)	19 (14)
Cellulitis	14 (8)	8 (5)	9 (7)	6 (5)
Diabetes	5 (3)	9 (5)	5 (4)	5 (4)
Alcohol-attributable diagnosis‡	20 (12)	31 (18)	17 (13)	28 (21)
Current admission for any alcohol-attributable diagnosis‡	66 (39)	90 (52)	57 (44)	80 (61)
Median lifetime comorbidity score (Q1–Q3)§	1 (0–2)	1 (0–2)	1 (0–2)	1 (0–2)
DSM-IV alcohol diagnoses during the past year, n (%)†				
Alcohol abuse	8 (5)	7 (4)	–	–
Alcohol dependence	129 (76)	132 (77)	–	–
No diagnosis	32 (19)	33 (19)	–	–
Alcohol consumption during the past 30 days†				
Median drinks/day (Q1–Q3)	3 (1–8)	4 (1–9)	5 (2–12)	5 (2–10)
Median drinks/drinking-day (Q1–Q3)	8 (5–14)	10 (6–15)	9 (6–16)	12 (7–16)
Median maximum drinks/occasion (Q1–Q3)	14 (8–24)	14 (9–24)	17 (12–24)	18 (12–24)
Alcohol-related characteristics				
AUDIT score ≥12, n (%)	114 (67)	116 (67)	100 (78)	105 (80)
Median score on readiness to change Taking Steps scale (Q1–Q3)†	30 (24–34)	29 (24–34)	31 (26–34)	31 (27–35)
Family history of alcoholism, n (%)	136 (82)	148 (88)	105 (83)	119 (93)
Median score for alcohol problems during the past 3 months (Q1–Q3)†	12 (3–24)	14 (4–29)	16 (9–27)	21 (9–34)
Drug use during the past 30 days, n (%)				
Cigarettes¶	129 (76)	128 (74)	105 (81)	102 (77)
Heroin or cocaine**	51 (30)	37 (22)	43 (33)	33 (25)
Any drug use††	106 (63)	89 (52)	86 (67)	75 (57)
History of psychiatric disorders or violence, n (%)				
Current panic disorder ‡‡	25 (15)	31 (18)	24 (19)	31 (23)
Current generalized anxiety disorder‡‡	126 (75)	121 (71)	109 (85)	104 (79)
Current substantial depressive symptoms§§	121 (72)	122 (71)	101 (79)	110 (83)
Current substantial PTSD symptoms	61 (36)	78 (45)	54 (42)	75 (57)
Any lifetime interpersonal violence (e.g., physical or sexual) ¶¶	124 (73)	115 (67)	102 (79)	96 (73)
Mean health-related quality-of-life score (SD)†				
Physical score	38 (9)	38 (9)	38 (9)	38 (9)
Mental score	40 (12)	40 (14)	38 (11)	37 (13)
Health care utilization during the past 3 months				
Alcohol assistance, n (%)†	34 (20)	52 (30)	33 (26)	52 (40)
Any alcohol treatment services, n (%)***	45 (27)	60 (35)	42 (33)	60 (46)
Any psychiatric treatment, n (%)	39 (23)	44 (26)	34 (26)	42 (32)
Psychiatric hospitalization, n (%)	6 (4)	6 (4)	6 (5)	6 (5)
Medical hospitalization, n (%)	49 (29)	49 (28)	39 (30)	45 (34)
Median days hospitalized (Q1–Q3)	0 (0–1)	0 (0–1)	0 (0–2)	0 (0–2)

Table 1—Continued

Variable	Overall		Patients with Alcohol Dependence	
	Control Group (n = 169)	Intervention Group (n = 172)	Control Group (n = 129)	Intervention Group (n = 132)
Emergency department use, n (%)	79 (47)	76 (44)	65 (50)	67 (51)
Median emergency department visits (Q1–Q3), n	0 (0–2)	0 (0–1)	1 (0–2)	1 (0–2)

* AUDIT = Alcohol Use Disorders Identification Test; COPD = chronic obstructive pulmonary disease; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; PTSD = posttraumatic stress disorder; Q1 = quartile 1 (or 25th percentile); Q3 = quartile 3 (or 75th percentile).

† See the Methods section for a description of how this characteristic was measured.

‡ Includes any of the following: acute alcoholic cirrhosis, alcoholic cardiomyopathy, alcoholic gastritis, alcoholic hepatitis, alcohol intoxication, alcoholic liver damage, alcoholic fatty liver, alcoholic pellagra, alcoholic polyneuropathy, alcohol withdrawal, alcohol withdrawal convulsion, alcohol withdrawal delirium, alcohol withdrawal hallucinosis, other alcoholic psychosis, alcoholic amnesic syndrome, other alcoholic dementia, alcoholic pancreatitis, or other diagnoses thought to be alcohol-attributable by the investigator (for example, “holiday heart,” alcoholic ketoacidosis, alcohol-related rhabdomyolysis) (29).

§ Determined by a validated questionnaire (20).

|| Determined by the Family History-Research Diagnostic Criteria (21).

¶ Based on a response of “yes, every day in the past 30 days” to the question: “Do you currently smoke?” (22).

** Determined by the Addiction Severity Index (ASI) (23).

†† Determined by the ASI and includes use of heroin; methadone; other opiates or analgesics; barbiturates; sedatives, hypnotics, or tranquilizers; cocaine; amphetamines; marijuana or cannabis; or hallucinogens.

‡‡ Determined by the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (24).

§§ A score of ≥ 16 on the Center for Epidemiologic Studies Depression scale (25, 26).

¶¶ A score of ≥ 44 on the Post Traumatic Stress Disorder Checklist (27).

¶¶¶ Determined by adapted items from the Traumatic Life Events Questionnaire, revised (28).

*** Includes alcohol assistance, except for medications, plus hospitalization for detoxification (any type); participation in any detoxification program; or halfway-house services.

Center for Research Resources (M01 RR00533). The funding agencies did not contribute to study design; data collection, analysis, or interpretation; or the decision to submit the manuscript for publication.

RESULTS

Research associates approached 7824 persons (10 273 admissions) (Figure). Of 5813 patients who were screened, 986 (17%) reported drinking risky amounts of alcohol in the past month; 341 of these patients enrolled in the study. According to screening data, these persons were significantly more likely to be black (45% vs. 31%) and to drink greater amounts (median, 24 vs. 18 drinks/wk) than were the 183 eligible patients who declined enrollment.

Of patients who enrolled in the study, 172 were randomly assigned to the intervention group and 169 were randomly assigned to the usual care group. Six patients in the intervention group left the hospital before receiving the intervention. Over 12 months, 11 patients died and 90% ($n = 308$) of all enrolled persons completed at least 1 follow-up visit. According to baseline data, persons who completed any follow-up were significantly more likely to be unemployed (66% vs. 42%), have visited an emergency department in the past 3 months (48% vs. 18%), and have substantial symptoms of posttraumatic stress disorder (a score of ≥ 44 on the Post Traumatic Stress Disorder Checklist [43% vs. 21%]) (27) than were those who were lost to follow-up.

The randomized groups had similar characteristics at enrollment, except for sex, alcohol-attributable medical diagnosis, receipt of alcohol assistance, and drug use (Table 1). More than three fourths of patients had current alcohol dependence. At 12 months, 37% of 140 patients in the

intervention group recalled discussing their drinking with a counselor; 28% of 145 patients in the control group reported such a discussion.

Alcohol Assistance (Dependent Patients Only)

In adjusted analyses among dependent patients ($n = 204$), 49% of persons in the intervention group and 44% of those in the control group received alcohol assistance by 3 months (adjusted odds ratio, 1.2 [CI, 0.6 to 2.5] and adjusted intervention–control difference, 5% [CI, –8% to 19%]; $P = 0.55$) (Table 2). Results were also nonsignificant (adjusted odds ratio, 1.0 [CI, 0.4 to 2.6]; $P = 0.93$) in adjusted, nonlinear mixed-effects models, as was the interaction between the intervention and both follow-up points ($P = 0.34$). In adjusted analyses among patients with AUDIT scores of 12 or greater, 48% in the intervention group and 43% in the control group received alcohol assistance by 3 months ($n = 183$) (adjusted odds ratio, 1.3 [CI, 0.6 to 2.7] and intervention–control difference, 6% [CI, –9% to 20%]) ($P = 0.55$).

The types of assistance received did not significantly differ between groups (Appendix, available at www.annals.org). Subject–interventionist sex concordance did not significantly affect results (unadjusted odds ratio for same-sex vs. opposite-sex interventionist, 2.1 [CI, 0.9 to 5.0]) ($P = 0.099$).

Changes in Alcohol Consumption

The number of drinks per day decreased in both groups at 12 months, although there was no significant difference between groups in adjusted analyses (Table 3). There was no significant interaction between the intervention and alcohol dependence ($P = 0.24$). In adjusted, linear mixed-effects models, the impact of brief intervention (adjusted mean group difference, –1.0 drink/d [CI, –3.0

Figure. Study flow diagram.



Participants who dropped out at 3 months were permanently lost to follow-up. Participants who could not be contacted at 3 months may have been contacted at 12 months. MMSE=Mini-Mental State Examination. *During the first 7 months of the study, 22% of the 5813 total screened participants were screened; 19% of those screened during this time were drinking risky amounts. During the remainder of the study (when we changed screening criteria and screened 78% of the 5813), 17% were drinking risky amounts. †Analyses for assistance at 3 months included only participants with alcohol dependence; at 3 months, 112 persons in the control group and 98 persons in the intervention group had alcohol dependence. All other analyses included all randomly assigned participants with available data.

Table 2. Receipt of Alcohol Assistance by 3 Months in Patients with Alcohol Dependence*

Analysist	Numbers and Proportions		Odds Ratio (95% CI) (in Intervention Group)	Intervention–Control Difference (95% CI), Percentage Points	P Value
	Control Group	Intervention Group			
Unadjusted, % (n/n)‡	39 (44/112)	52 (50/97)	1.6 (0.9 to 2.8)	12 (–1 to 26)	0.08
Adjusted, %§	44	49	1.2 (0.6 to 2.5)	5 (–8 to 19)	0.55

* In adjusted analyses among patients with Alcohol Use Disorders Identification Test scores ≥ 12 , 48% in the intervention group and 43% in the control group linked with alcohol assistance by 3 months ($n = 183$); adjusted odds ratio, 1.3 (95% CI, 0.6 to 2.7); intervention–control difference, 6 (CI, –9 to 20) percentage points ($P = 0.55$).

† There were 209 patients in the unadjusted analysis and 204 (110 control, 94 intervention) patients in the adjusted analysis.

‡ A total of 210 persons with alcohol dependence were interviewed at 3 months; however, 1 did not answer questions about alcohol assistance.

§ Adjusted for sex, alcohol assistance at 3 months before enrollment, family history of alcoholism, any drug use, alcohol problem score, and alcohol-attributable medical diagnoses.

|| Results in this table are based on a complete-case analysis. In mixed-effects models, the adjusted odds ratio was 1.0 (CI, 0.4 to 2.6) ($P = 0.93$).

to 1.0], favoring patients in the control group) ($P = 0.33$) and the interaction between the intervention and both follow-up points ($P = 0.29$), were nonsignificant. Sex concordance did not significantly affect results (unadjusted mean difference for same-sex vs. opposite-sex intervention-ist, 1.1 drinks/d [CI, –2.0 to 4.1]; $P = 0.49$).

The intervention did not significantly improve the other consumption outcomes (Table 3). Patients in both groups decreased heavy drinking episodes and increased the number of days abstinent. There was a significant adjusted mean group difference in days abstinent favoring the patients in the control group.

Readiness to Change, Alcohol Problems, Quality of Life, and Health Care Utilization

In adjusted analyses at 12 months, the intervention did not significantly affect readiness to change, alcohol problems, physical or mental health-related quality of life, emergency department visits, or days hospitalized (data not shown).

DISCUSSION

Screening for unhealthy alcohol use and providing brief intervention did not lead to receipt of assistance for alcohol-dependent medical inpatients and had no effect on consumption or nonconsumption outcomes among all patients. The 95% CIs for the intervention versus control differences did not consistently include important intervention effects.

Studies of the efficacy of brief intervention for unhealthy alcohol use in hospitalized patients have produced mixed results. Some studies of medical inpatients support its efficacy, whereas others do not (41, 44–49). A systematic review of controlled studies found an association between brief intervention and decreased alcohol-related problems but not alcohol consumption for inpatients on medical and other hospital services (7). Studies of inpatients on nonmedical services, however, have more consistently demonstrated the efficacy of brief intervention for decreasing alcohol consumption (9, 42, 50–52) and in-

Table 3. Alcohol Consumption Outcomes at 12 Months in Patients with Unhealthy Alcohol Use

Consumption Measures during the Past 30 Days	Mean Unadjusted Changes from Enrollment \pm SE		Mean Adjusted Group Differences* (95% CI) ($n = 280$)	P Value
	Control Group ($n = 146$)	Intervention Group ($n = 141$)		
Decrease in drinks/d, n †	2.6 \pm 0.8	1.8 \pm 0.7	–1.5 (–3.7 to 0.6)‡	0.169
Decrease in heavy drinking episodes, n §	3.8 \pm 0.9	3.4 \pm 1.0	–1.7 (–4.4 to 0.9)	0.193
Increase in days abstinent, n	4.2 \pm 1.0	2.5 \pm 1.0	–2.9 (–5.7 to –0.1)	0.042
	Numbers and Unadjusted Proportions		Adjusted Odds Ratio (95% CI)	P Value
Drinking risky amounts, n (%)¶	93 (64)	87 (62)		
Heavy drinking episodes, n (%)§	91 (62)	87 (62)	1.2 (0.7 to 2.0)	0.55
Abstinence, n (%)	40 (27)	42 (30)	0.9 (0.5 to 1.6)	0.78

* Adjusted for sex, alcohol assistance in the 3 months before enrollment, family history of alcoholism, any drug use, alcohol problem score, and alcohol-attributable medical diagnoses.

† Adjusted mean decreases in drinks per day: 3.1 \pm 0.8 for patients in the control group and 1.5 \pm 0.8 for patients in the intervention group.

‡ Results in this table are based on a complete-case analysis. In adjusted, linear mixed-effects models, the adjusted mean group difference for drinks per day was –1.0 drink per day (95% CI, –3.0 to 1.0; $P = 0.33$).

§ ≥ 5 drinks per occasion for men or ≥ 4 drinks per occasion for women and persons ≥ 66 years.

|| Control group is the reference; adjusted for mean drinks per day at enrollment, sex, alcohol assistance in the 3 months before enrollment, family history of alcoholism, any drug use, alcohol problem score, and alcohol-attributable medical diagnoses.

¶ > 14 standard drinks per week or ≥ 5 drinks per occasion for men; > 7 drinks per week or ≥ 4 drinks per occasion for women and persons ≥ 66 years.

creasing entry into alcohol treatment entry and use of mutual-help groups (42, 50) (although some studies, including those done in emergency departments and trauma centers, have shown nonsignificant main effects) (9, 53).

Various factors might explain why the intervention did not have the anticipated effects. First, medical illnesses, hospitalization, or a research assessment that could have motivated patients contemplating change may have contributed to decreased alcohol consumption in both randomized groups. Second, we shaped the intervention to ensure its feasibility and replicability; a more extensive intervention might produce greater effects but would probably be harder to disseminate. Third, although it is uncertain, patients in the intervention group might have fared better if a medical clinician and/or a clinician they knew had provided the intervention. Fourth, the inadequacy of brief intervention in dependent drinkers may not be surprising because its efficacy for addressing dependence has been shown only in persons who seek treatment (54), unlike our patients.

Our study has several notable strengths. Unlike some studies, ours was randomized and used validated screening and diagnostic tools. We concealed randomization and analyzed patients in the groups to which they were randomized regardless of receipt of intervention. We conducted screening and brief intervention that could be reproduced in clinical practice (for example, no strict exclusion criteria, such as psychiatric illness or other drug use; pragmatic staff training; strategies that staff with a range of expertise could easily administer). We also examined the entire spectrum of unhealthy alcohol use (including dependence) in a diverse sample. This is especially important because screening in clinical practice identifies the entire spectrum and requires clinicians to address nondependent and dependent drinking.

Several methodological limitations should be considered when interpreting these results. Baseline imbalances existed between groups despite randomization; however, we adjusted for these imbalances. The complete-case analysis may be biased because we achieved 90%, not 100%, follow-up. Still, results from mixed-effects models were similar. Although all analyses compared patients in the groups to which they were randomly assigned, the alcohol assistance analysis was conducted only in the subgroup of patients for whom it was relevant—those with dependence (identified by the CIDI and not the AUDIT, which had been the stratification variable). Nevertheless, an analysis of patients with AUDIT scores of 12 or greater yielded similar results.

Research associates and patients could not be blinded; regardless, patients were generally interviewed at follow-up by a research associate whom they had not met; research associates would most likely have forgotten group assignment; and during follow-up, patients often could not correctly remember the group to which they had been randomized. Primary outcomes were self-reported but were

assessed by trained research associates using validated, standardized procedures (55). Further, biological measures are not better than self-report for consumption outcomes, and administrative data cannot capture the range of assistance received, including mutual help.

We changed screening criteria early in the study, but the proportions of patients identified as drinking risky amounts were similar with the original criteria and the changed criteria (19% and 17%, respectively) (12). Screening may not have been sensitive for nondependent unhealthy alcohol use. Still, a recent systematic review of hospital studies also found that 17% of inpatients had positive results on screening for unhealthy alcohol use (56). Patients in the control group received slightly more than usual care (assessment and notification, as part of informed consent, that their unhealthy drinking made them eligible and that they could discuss their drinking with their clinicians). An assessment effect, however, would probably be minimal in these primarily non-treatment-seeking patients (54, 57). Further, many studies supporting the efficacy of brief intervention include a control group that provided informed consent and had substantial assessments. Lastly, generalizability may be limited to patients seen in many large, urban academic hospitals.

According to results from our study and others, brief intervention—a currently recommended practice—is inadequate for medical inpatients with unhealthy alcohol use (primarily dependence) to link with assistance for alcohol dependence and to reduce consumption and problems. In fact, our finding that patients in the intervention group had a smaller increase in abstinent days is consistent with the findings of a previous report of the possible harms of brief intervention (58). Although our study does not exclude the possibility that medical inpatients with nondependent unhealthy alcohol use (a small group) might respond to brief intervention, evidence for this benefit is unclear (7). Because of the need for effective brief approaches, future research should identify strategies that strengthen currently available interventions, such as multiple or booster sessions and components tailored to patients' needs. New interventions should involve staff with expertise in health behavior change and include all known efficacious therapies (for example, naltrexone or acamprosate for dependence). Further, studies of new efforts should use methods that separate intervention effects from the effects of research participation.

The high prevalence of unhealthy alcohol use among medical inpatients has important implications for acute and long-term patient care. Brief interventions alone may not be the solution. Screening hospitalized patients for unhealthy alcohol use has some value (for example, to identify drug interactions and risk for withdrawal). Brief intervention in hospitals, if supplemented with discussions with a clinician over time, also may serve as a seed that later helps catalyze change. But as a matter of policy, efforts focused on screening and brief intervention in hospitals should be

directed elsewhere, possibly toward more intensive interventions, follow-up care, or on subgroups of patients who are more likely to benefit. Additional research must identify the most effective interventions to address unhealthy alcohol use, particularly dependence, among hospitalized patients.

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Acknowledgments: The authors thank the staff and patients of the medical inpatient service and CARE Unit research associates at Boston Medical Center; the staff and house staff of the Boston University Internal Medicine Residency Training Program; and Karen Sullivan, Nicole Tibberts, Alison Pedley, and other data management staff at DM-STAT, Malden, Massachusetts.

Grant Support: This study was supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA RO1 12617) and a General Clinical Research Center grant from the National Center for Research Resources (M01 RR00533).

Potential Financial Conflicts of Interest: *Honoraria:* R. Saitz (Fusion Medical Education). All authors have received grant support from the National Institute on Alcohol Abuse and Alcoholism.

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References

1. Institute of Medicine. Broadening the Base of Treatment for Alcohol Problems: Report of a Study by a Committee of the Institute of Medicine, Division of Mental Health and Behavioral Medicine. Washington, DC: National Academy Press; 1990.
2. U.S. Preventive Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: recommendation statement. *Ann Intern Med.* 2004;140:554-6. [PMID: 15068984]
3. Buchsbaum DG, Buchanan RG, Poses RM, Schnoll SH, Lawton MJ. Physician detection of drinking problems in patients attending a general medicine practice. *J Gen Intern Med.* 1992;7:517-21. [PMID: 1403208]
4. Saitz R. Clinical practice. Unhealthy alcohol use. *N Engl J Med.* 2005;352:596-607. [PMID: 15703424]
5. Maisto SA, Saitz R. Alcohol use disorders: screening and diagnosis. *Am J Addict.* 2003;12 Suppl 1:S12-25. [PMID: 14972777]
6. Wilk AI, Jensen NM, Havighurst TC. Meta-analysis of randomized control trials addressing brief interventions in heavy alcohol drinkers. *J Gen Intern Med.* 1997;12:274-83. [PMID: 9159696]
7. Emmen MJ, Schippers GM, Bleijenberg G, Wollersheim H. Effectiveness of opportunistic brief interventions for problem drinking in a general hospital setting: systematic review. *BMJ.* 2004;328:318. [PMID: 14729657]
8. Longabaugh R, Woolard RE, Nirenberg TD, Minugh AP, Becker B, Clifford PR, et al. Evaluating the effects of a brief motivational intervention for injured drinkers in the emergency department. *J Stud Alcohol.* 2001;62:806-16. [PMID: 11838918]
9. Gentilello LM, Rivara FP, Donovan DM, Jurkovich GJ, Daranciang E, Dunn CW, et al. Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence. *Ann Surg.* 1999;230:473-80; discussion 480-3. [PMID: 10522717]
10. Mitka M. "Teachable moments" provide a means for physicians to lower

- alcohol abuse. *JAMA.* 1998;279:1767-8. [PMID: 9628694]
11. Tunis SR, Stryer DB, Clancy CM. Practical clinical trials: increasing the value of clinical research for decision making in clinical and health policy. *JAMA.* 2003;290:1624-32. [PMID: 14506122]
12. Saitz R, Freedner N, Palfai TP, Horton NJ, Samet JH. The severity of unhealthy alcohol use in hospitalized medical patients. The spectrum is narrow. *J Gen Intern Med.* 2006;21:381-5. [PMID: 16686818]
13. Smith KL, Horton NJ, Saitz R, Samet JH. The use of the mini-mental state examination in recruitment for substance abuse research studies. *Drug Alcohol Depend.* 2006;82:231-7. [PMID: 16256278]
14. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res.* 1975;12:189-98. [PMID: 1202204]
15. Reinert DF, Allen JP. The Alcohol Use Disorders Identification Test (AUDIT): a review of recent research. *Alcohol Clin Exp Res.* 2002;26:272-9. [PMID: 11964568]
16. Friedmann PD, Saitz R, Gogineni A, Zhang JX, Stein MD. Validation of the screening strategy in the NIAAA "Physicians' Guide to Helping Patients with Alcohol Problems". *J Stud Alcohol.* 2001;62:234-8. [PMID: 11332444]
17. National Institute on Alcohol Abuse and Alcoholism. Helping Patients with Alcohol Problems. A Health Practitioner's Guide. Bethesda, MD: National Institutes of Health; 2003.
18. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption—II. *Addiction.* 1993;88:791-804. [PMID: 8329970]
19. Miller WR, Rollnick S. Motivational Interviewing: Preparing People for Change. 2nd ed. New York: Guilford Press; 2002.
20. Katz JN, Chang LC, Sangha O, Fossil AH, Bates DW. Can comorbidity be measured by questionnaire rather than medical record review? *Med Care.* 1996;34:73-84. [PMID: 8551813]
21. Andreasen NC, Endicott J, Spitzer RL, Winokur G. The family history method using diagnostic criteria. Reliability and validity. *Arch Gen Psychiatry.* 1977;34:1229-35. [PMID: 911222]
22. Patrick DL, Cheadle A, Thompson DC, Diehr P, Koepsell T, Kinne S. The validity of self-reported smoking: a review and meta-analysis. *Am J Public Health.* 1994;84:1086-93. [PMID: 8017530]
23. McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, et al. The Fifth Edition of the Addiction Severity Index. *J Subst Abuse Treat.* 1992;9:199-213. [PMID: 1334156]
24. Spitzer RL, Williams JB, Kroenke K, Linzer M, deGruy FV 3rd, Hahn SR, et al. Utility of a new procedure for diagnosing mental disorders in primary care. The PRIME-MD 1000 study. *JAMA.* 1994;272:1749-56. [PMID: 7966923]
25. Boyd JH, Weissman MM, Thompson WD, Myers JK. Screening for depression in a community sample. Understanding the discrepancies between depression symptom and diagnostic scales. *Arch Gen Psychiatry.* 1982;39:1195-200. [PMID: 7125849]
26. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement.* 1977;1:385-401.
27. Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA. Psychometric properties of the PTSD Checklist (PCL). *Behav Res Ther.* 1996;34:669-73. [PMID: 8870294]
28. Kubany ES, Haynes SN, Leisen MB, Owens JA, Kaplan AS, Watson SB, et al. Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: the Traumatic Life Events Questionnaire. *Psychol Assess.* 2000;12:210-24. [PMID: 10887767]
29. Adams WL, Yuan Z, Barboriak JJ, Rimm AA. Alcohol-related hospitalizations of elderly people. Prevalence and geographic variation in the United States. *JAMA.* 1993;270:1222-5. [PMID: 8355385]
30. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC: American Psychiatric Association; 1994.
31. Robins LN, Wing J, Wittchen HU, Helzer JE, Babor TF, Burke J, et al. The Composite International Diagnostic Interview. An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Arch Gen Psychiatry.* 1988;45:1069-77. [PMID: 2848472]
32. World Health Organization. Composite International Diagnostic Interview (CIDI) (Core Version 2.0). Geneva, Switzerland: World Health Organization; 1996.
33. Miller WR, Rollnick S. Motivational Interviewing: Preparing People to

Change Addictive Behavior. New York: Guilford Press; 1991.

34. McLellan AT, Alterman AI, Cacciola J, Metzger D, O'Brien CP. A new measure of substance abuse treatment. Initial studies of the treatment services review. *J Nerv Ment Dis.* 1992;180:101-10. [PMID: 1737971]
35. Miller WR. Form 90. A Structured Assessment Interview for Drinking and Related Behaviors. Test Manual. Project MATCH Monograph Series, 5. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 1996.
36. Sobell LC, Sobell MB. Timeline follow-back: a technique for assessing self-reported alcohol consumption. In: Litten RZ, Allen JP, eds. *Measuring Alcohol Consumption: Psychosocial and Biochemical Methods.* Totowa, NJ: Humana Pr, Inc.; 1992:41-69.-
37. National Institute on Alcohol Abuse and Alcoholism. *Helping Patients Who Drink Too Much: A Clinician's Guide.* Bethesda, MD: National Institutes of Health; 2005.
38. Miller W, Tonigan J. Assessing drinkers' motivation for change: the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES). *Journal of Psychological Addictive Behaviors.* 1996;10:81-9.
39. Miller WR, Tonigan J, Longabaugh R. The Drinker Inventory of Consequences (DrInC). An Instrument for Assessing Adverse Consequences of Alcohol Abuse. Test Manual. Project MATCH Monograph Series 4. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 1995.
40. Ware JE, Kosinski M, Keller SD. SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales. 3rd ed. Lincoln, RI and Boston, MA: QualityMetric Inc. and the Health Assessment Lab 1998.
41. Welte JW, Perry P, Longabaugh R, Clifford PR. An outcome evaluation of a hospital-based early intervention program. *Addiction.* 1998;93:573-81. [PMID: 9684395]
42. Elvy GA, Wells JE, Baird KA. Attempted referral as intervention for problem drinking in the general hospital. *Br J Addict.* 1988;83:83-9. [PMID: 3345386]
43. Fleming MF, Barry KL, Manwell LB, Johnson K, London R. Brief physician advice for problem alcohol drinkers. A randomized controlled trial in community-based primary care practices. *JAMA.* 1997;277:1039-45. [PMID: 9091691]
44. Heather N, Rollnick S, Bell A, Richmond R. Effects of brief counselling among male heavy drinkers identified on general hospital wards. *Drug Alcohol Rev.* 1996;15:29-38. [PMID: 16203349]
45. Chick J, Lloyd G, Crombie E. Counselling problem drinkers in medical wards: a controlled study. *Br Med J (Clin Res Ed).* 1985;290:965-7. [PMID: 2858246]
46. Watson HE. A study of minimal interventions for problem drinkers in acute care settings. *Int J Nurs Stud.* 1999;36:425-34. [PMID: 10519687]
47. Rowland N, Maynard AK. Standardized alcohol education: a hit or miss affair? *Health Promot Int.* 1993;8:5-12.
48. Kuchipudi V, Hobein K, Flickinger A, Iber FL. Failure of a 2-hour motivational intervention to alter recurrent drinking behavior in alcoholics with gastrointestinal disease. *J Stud Alcohol.* 1990;51:356-60. [PMID: 2359309]
49. Dunn CW, Ries R. Linking substance abuse services with general medical care: integrated, brief interventions with hospitalized patients. *Am J Drug Alcohol Abuse.* 1997;23:1-13. [PMID: 9048144]
50. Blondell RD, Looney SW, Northington AP, Lasch ME, Rhodes SB, McDaniels RL. Can recovering alcoholics help hospitalized patients with alcohol problems? *J Fam Pract.* 2001;50:447. [PMID: 11350721]
51. Hulse GK, Tait RJ. Six-month outcomes associated with a brief alcohol intervention for adult in-patients with psychiatric disorders. *Drug Alcohol Rev.* 2002;21:105-12. [PMID: 12188988]
52. Antti-Poika I, Karaharju E, Roine R, Salaspuro M. Intervention of heavy drinking—a prospective and controlled study of 438 consecutive injured male patients. *Alcohol Alcohol.* 1988;23:115-21. [PMID: 3390235]
53. Monti PM, Colby SM, Barnett NP, Spirito A, Rohsenow DJ, Myers M, et al. Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *J Consult Clin Psychol.* 1999;67:989-94. [PMID: 10596521]
54. Moyer A, Finney JW, Swearingen CE, Vergun P. Brief interventions for alcohol problems: a meta-analytic review of controlled investigations in treatment-seeking and non-treatment-seeking populations. *Addiction.* 2002;97:279-92. [PMID: 11964101]
55. Del Boca FK, Noll JA. Truth or consequences: the validity of self-report data in health services research on addictions. *Addiction.* 2000;95 Suppl 3:S347-60. [PMID: 11132362]
56. Roche AM, Freeman T, Skinner N. From data to evidence, to action: findings from a systematic review of hospital screening studies for high risk alcohol consumption. *Drug Alcohol Depend.* 2006;83:1-14. [PMID: 16310323]
57. Palfai TP, Fairholme C, Zisseron R, Saitz R. Effects of normative feedback and motivation assessment on college student hazardous drinking [Abstract]. *Alcohol Clin Exp Res.* 2006;30:210A.
58. Beich A, Thorsen T, Rollnick S. Screening in brief intervention trials targeting excessive drinkers in general practice: systematic review and meta-analysis. *BMJ.* 2003;327:536-42. [PMID: 12958114]

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59. Miller WR, Zweben A, DiClemente CC, Rychtarik RG. Motivational Enhancement Therapy Manual: A Clinical Research Guide for Therapists Treating Individuals with Alcohol Abuse and Dependence. Project MATCH Monograph Series, 2. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 1995.

APPENDIX: DESCRIPTION OF THE INTERVENTION

We assigned the patients in the intervention group to a 30-minute session of brief motivational counseling based on the principles of motivational interviewing (19, 32) and strategies of motivational enhancement therapy (59). Interventionists had 1 to 6 years of clinical experience and received 2.5 days of skills-based training by motivational interviewing trainers. Interventionists practiced with one another and with 1 to 3 inpatients until they demonstrated the required skills to the trainers. A licensed clinical psychologist provided weekly group supervision that included a review of approximately 30% of patient interventions (that had been audiotaped) to prevent drift.

Through an empathic, respectful, and collaborative interviewing style, interventionists aimed to increase patients' awareness about the risks and problems of drinking, to help patients recognize the discrepancy between their current alcohol use and their values and goals, and to enhance patients' self-efficacy for change. Counseling sessions, which began only after interventionists gained the explicit permission of patients to discuss alco-

hol use, included feedback, an open discussion (lasting approximately 20 minutes), and construction of a change plan. Patients received individualized feedback based on data from their interviews (current alcohol consumption, Alcohol Use Disorders Identification Test [AUDIT] scores, readiness to change, and alcohol problems) and their clinical records (alcohol-related laboratory results and medical diagnoses). After being told how their drinking compared with sex-specific national norms and about their risks for harm (59), patients were invited to ask questions or to comment on the interventionist's feedback. Interventionists responded and followed with open-ended questions and reflective listening to convey empathy and to help the patients become more aware of how alcohol was influencing their lives. Finally, interventionists and patients generated a drinking change plan, which included anticipating obstacles and ranged from agreeing to consider changes in drinking to taking specific actions. When a patient granted permission, interventionists shared the contents of the session with his or her inpatient physician team and/or social workers. (We do not know how often this occurred). Within a week of the intervention, we mailed patients a copy of the change plans and a personalized letter from the interventionist that summarized the discussion and supported the patient's change efforts.

Postintervention Survey

To determine whether the intervention was consistent with the principles of motivational interviewing, we asked the patients to complete a survey immediately after the intervention, which they returned in a sealed envelope to the interventionist. (We informed the patients that the interventionists would not view the survey responses.) The survey included 12 questions that assessed the empathy of interventionists and whether they helped increase self-efficacy, instilled a sense of personal responsibility for change, reviewed the pros and cons of drinking, and facilitated change planning.

Of the 161 patients who completed the postintervention survey, most agreed that they felt understood (88%) or cared for (87%) by the interventionist. They agreed that the interventionist helped them believe that they could change their drinking (85%), see the pros and cons of their drinking (79%), recognize that changing drinking was their personal responsibility (83%), and generate a plan for their drinking (73%).

Recall of the Intervention

At the 12-month follow-up, we asked the patients in the intervention and control groups the following question to assess their recall of receiving counseling at study entry: "As you may recall, everyone in this study was interviewed in the hospital for about an hour and asked questions about their physical and mental health and about their drinking. After this, some people also met with a counselor to discuss their drinking. Did you meet with a counselor in the hospital to discuss your drinking?" Thirty-seven percent of 140 patients in the intervention group recalled discussing their drinking with a counselor; 28% of 145 patients in the control group reported such a discussion.

Types of Alcohol Assistance Received

The types of alcohol assistance received did not significantly differ between the intervention and control groups: In unadjusted analyses of alcohol-dependent patients, 5% of patients in the intervention group and 6% of patients in the control group

received residential treatment; 8% and 6%, respectively, received outpatient care; and 46% and 36%, respectively, participated in a mutual-help group. Only 3 patients participated in an employee-assistance program, and 1 patient received naltrexone for drinking.