ORIGINAL RESEARCH

Alcohol Use Disorder Treatment: The Association of Pretreatment Use and the Role of Drinking Goal

Lisa Berger, PhD, Michael Brondino, PhD, Michael Fisher, MD, Robert Gwyther, MD, and James C. Garbutt, MD

Background: **In a recent study conducted in a family medicine setting, the medication acamprosate was found not to be efficacious in the treatment of alcohol dependence, but a drinking goal of abstinence was found to have positive effects on alcohol use outcomes. The purpose of this secondary analysis was to further understand which patients with an alcohol use disorder may be most successfully treated in a primary care setting.**

Methods: **The study was exploratory and used a trajectory-based approach based on data from the acamprosate treatment trial of 100 participants (recruited mostly by advertisement) who were randomly assigned to receive either acamprosate or a matching placebo. Post hoc trajectories of alcohol use before treatment were identified to examine whether trajectory classes and their interactions with treatment arm (acamprosate or placebo), pretreatment drinking goal (abstinence or a reduction), and time predicted alcohol use outcomes.**

Results: **Three distinct trajectory classes were identified: frequent drinkers, nearly daily drinkers, and consistent daily drinkers. Consistent daily drinkers with a goal of abstinence significantly improved over time on the primary outcome measure of percent days abstinent when compared with frequent and nearly daily drinkers. In addition, all participants with a goal of abstinence, regardless of trajectory class, significantly reduced their percentage of heavy drinking days over time.**

Conclusions: **Patients with an alcohol use disorder who have a drinking goal of abstinence, in particular consistent daily drinkers, may maximally benefit from alcohol use disorder treatment, including the use of medication, in a primary care setting. (J Am Board Fam Med 2016;29:37–49.)**

Keywords: **Alcoholism**

For the past 30 years and more, alcohol intervention clinicians and researchers have viewed the primary care setting as a logical place in which to intervene with individuals who misuse alcohol.[1–3] In particular, primary care and other community settings have been identified as locations in which to address nondependent or nondisordered alcohol use as part of primary and secondary prevention efforts.[1,2] At present there exists a substantial body of evidence on the effectiveness of alcohol screening and brief interventions among primary care patients with nondependent but excessive alcohol use.[4] Yet, in terms of disordered alcohol use, physicians have long recognized the difficulty of treating alcohol-related medical conditions if an alcohol use disorder is not treated alongside such medical ailments.[5] Some recent national efforts have called for primary care clinicians to treat alcohol-dependent patients with pharmacotherapy, brief behavioral counseling, and alcoholism disease management.[6]

Few studies to date, however, have focused on the treatment of alcohol-dependent patients (per the *Diagnostic and Statistical Manual of Mental Diseases, 4th Edition* [DSM-IV])[7] or, now, patients with

This article was externally peer reviewed.
Submitted 27 April 2015; revised 29 July 2015; accepted 10 August 2015.
From the Center for Applied Behavioral Health Research, University of Wisconsin, Milwaukee (LB, MB); the Department of Family Medicine (MF, RG), the Bowles Center for Alcohol Studies (RG, JCG), and the Department of Psychiatry (JCG), University of North Carolina at Chapel Hill.
Funding: The parent study upon which this secondary analysis is based was funded by an investigator-initiated grant from the Forest Research Institute.
Conflict of interest: none declared.
Corresponding author: James C. Garbutt, MD, CB No. 7160, Department of Psychiatry, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-7160 (E-mail jc_garbutt@med.unc.edu).

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

an alcohol use disorder per the *Diagnostic and Statistical Manual of Mental Diseases, 5th Edition*)[8] in primary care settings. In a recent review, Saitz[9] found no evidence of the efficacy of opportunistic alcohol screening and brief intervention for alcohol-dependent patients in primary care. Yet investigators of other primary care studies, in which alcohol-dependent patients were not necessarily identified by alcohol screening, found behavioral counseling and behavioral counseling with medication (acamprosate or naltrexone) to be efficacious/effective.[10–12] For example, in a pragmatic study in which French generalist practitioners offered routine care to alcohol-dependent patients, Malet and colleagues[10] found that visit frequency and visits in which alcohol use was addressed were both significantly associated with patient detoxification in which patients stopped drinking for a period of time. In other studies of alcohol-dependent or alcohol-abusing individuals, mostly in alcohol treatment settings but also in primary care–only settings, investigators found associations between a drinking goal of abstinence and improved alcohol use outcomes.[13–17] Finally, although not in a purely primary care setting, a trajectory-based investigation of alcohol use before treatment assignment among alcohol-dependent individuals revealed that very frequent drinkers, defined as a 75% probability of any alcohol use on a given day, benefited from acamprosate in that they were more likely to abstain from heavy drinking during the past 2 months of treatment.[18] In that same investigation, very frequent drinkers also benefited from the medication naltrexone in that they were more likely to be continuously abstinent.[18] An advantage of a trajectory-based approach is that it may identify a group(s) of individuals for whom alcohol treatments, including medications, could be effective.[18]

This study is a secondary analysis of a placebo-controlled trial of acamprosate treatment in a family medicine setting in which no significant effect of acamprosate was found, but a drinking goal of abstinence was found to have robust, positive effects on drinking outcomes.[14] The purpose of the current study was to use a trajectory approach to understand further which patients with an alcohol use disorder may be most successfully treated in a primary care setting. The study aims were to identify trajectories of pretreatment alcohol use, describe participants in these trajectories, and examine whether the trajectories predict alcohol use outcomes and/or moderate treatment response to acamprosate. Drinking goal was also examined as an empirically supported predictor of drinking outcomes. This is, to our knowledge, the first study to apply a trajectory-based approach to clinical trial data collected in a primary care setting regarding the treatment of alcohol use disorder.

Methods

Study Design

The study was exploratory and involved a secondary analysis of data collected between July 2006 and April 2008 as part of a randomized, double-blind, placebo-controlled study of acamprosate in the treatment of alcohol-dependent individuals recruited from 2 family medicine sites: the Family Practice Center, University of North Carolina at Chapel Hill, and the Aurora Health Care Center, Mayfair Family Practice and Primary Care Clinics, Milwaukee, Wisconsin. The medication acamprosate (Campral; Forest Laboratories, New York, NY) was approved in 2004 by the US Food and Drug Administration for the maintenance of abstinence in alcohol-dependent individuals who, at the time of medication initiation, also are receiving psychosocial support.[19] As a result, participants in the acamprosate treatment trial (hereafter referred to as "the parent study") had to have at least 3 days of abstinence before treatment randomization, and, in addition to either receiving acamprosate or placebo, participants also received 5-, 20-, or 30-minute sessions of brief behavioral counseling from a family practice or primary care physician. These sessions were held at each of the 5 study visits: screening, randomization/baseline (week 0, which occurred once a participant had at least 3 days of abstinence), and weeks 2, 6, and 12.

The brief behavioral counseling intervention was based on the one developed and implemented in community-based primary care clinics by Fleming and colleagues.[20] Because participants in the parent study were alcohol dependent, the intervention implemented by Fleming et al was expanded from 2 to 5 sessions, and the session time increased from 15 to 20 minutes, with the exception of the first session, which was 30 minutes in duration. An intervention workbook guided session discussions between study physicians and participants and included both motivational and cognitive-behavioral intervention components.[21] Alcoholics Anonymous

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

attendance also was encouraged but not required. Specifically, the brief behavioral counseling intervention focused on alcohol use patterns and negative consequences, personalized feedback on alcohol use, reasons for and against change in one's alcohol use, drinking goal (abstinence or a self-defined reduction in alcohol use), and strategies for coping with alcohol cravings and risky alcohol use situations. Study physicians encouraged participants to read and complete workbook sections between sessions. In addition to discussions of medication adherence and side effects, participants' drinking goals were monitored and risky alcohol use situations reviewed at each session. Finally, standardized training was provided to study physicians at the beginning of the study, and fidelity to the brief behavioral counseling intervention was monitored and maintained by regularly scheduled conference calls between the 2 study sites.

Sample

Participants in the parent study included 100 male and female outpatients between the ages of 21 to 65 years who had a current DSM-IV diagnosis of alcohol dependence.[7,22] Individuals with a history of alcohol withdrawal seizure or delirium tremens were excluded from participation because of the potential need for more intensive care. Individuals who recently completed medical detoxification, however, were considered for study enrollment. Participants were recruited via provider referral (10%), but mostly through newspaper and radio advertising (90%). Study participants were mostly male (62%), non-Hispanic white (91.9%), married (63%), and were, on average, 47 years of age (mean, 47.2 years; standard deviation [SD], 8.06 years). Less than half (47%) had a college education, and slightly more than half (60%) were enrolled at the University of North Carolina at Chapel Hill; 40% were enrolled at the Milwaukee, Wisconsin, site. The parent study was approved by the institutional review boards at the 2 study sites, and methods of the parent study are described in greater detail elsewhere.[14]

Measures/Variables

In this study the primary and secondary alcohol use outcome variables, respectively, were percentage of days abstinent (PDA) and percent heavy drinking days (%HDD) as derived from the interviewer-administered Timeline Followback (TLFB) measure.[23,24] The TLFB is a retrospective, calendar-based instrument used to record daily alcohol consumption in US standard drink units (1 standard drink = ~14 g ethanol)[25] and was administered at screening, randomization/baseline (week 0), and study weeks 2, 6, and 12. Several TLFB administration techniques were used to enhance the accuracy of participant self-report, such as the use of recall aids (eg, local events typed into the calendar to help with recall).[26] Heavy drinking days were defined as ≥4 US standard drinks per drinking day for women, and ≥5 US standard drinks per drinking day for men.[25] The screening TLFB data also were used to identify trajectories of alcohol use before treatment.

Drinking goal was assessed at the screening visit as part of interviewer-administered enrollment forms. Participants considered and selected a drinking goal of either abstinence (37%) or a self-defined reduction in alcohol use (63%) before meeting with a study physician. There was no significant difference between study site and participant selection of a drinking goal.

Finally, we also used several clinical characteristic and sociodemographic variables as assessed/recorded at the screening visit. The clinical characteristic variables included 2 alcohol dependence severity variables as assessed by the interviewer-administered Structured Clinical Interview for DSM-IV.[22] The first variable was the severity of participant alcohol dependence for the worst week in the past month. Study-trained interviewers categorized severity as mild, moderate, or severe based on impairment in the participants' occupational functioning, social activities, or relationships. The second severity variable as assessed by the Structured Clinical Interview for DSM-IV was whether there was current evidence of physiologic dependence, based on participant experience of tolerance and/or withdrawal symptoms in the past 3 months. Another clinical characteristic variable was γ-glutamyl transferase, a relatively specific biomarker of continuous heavy alcohol use[27]; based on concentration, participants were categorized as either having normal or high (>78 units/L) γ-glutamyl transferase. Additional clinical characteristic variables included total score on 2 commonly used self-report alcohol screening measures in primary care settings: the 10-item Alcohol Use Disorders Identification Test (scoring range, 0–40),[28] and the 4-item CAGE questionnaire (scoring range, 0–4).[29] Finally,

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

the Clinical Global Impression Scale (scoring range, 1–7)[30] was also used by study physicians to globally assess the severity of participants' alcohol dependence.

Sociodemographics, which were collected as part of the interviewer-administered enrollment forms, included the dichotomous variables of sex, racial/ethnic minority status, college education, married, current tobacco use, family history of alcoholism, previous alcohol treatment (defined as mutual-support help, outpatient counseling, and/or inpatient detoxification), and the continuous variables of age and years of alcohol use. The family history of alcoholism variable was based on a modified version of the Family Tree Questionnaire for Assessing Family History of Alcohol Problems,[31] in which a participant was considered to have a family history if any first- or second-degree relatives had or have a drinking problem.

Data Analysis

Latent class growth modeling,[32] which assumed fixed polynomial trends over time, was used to identify distinct trajectory classes based on the probability of any pretreatment alcohol use on a given day. Screening data from the TLFB, which included 87 of the 90 days before the randomization/baseline visit (week 0), were used to identify trajectory classes. Because acamprosate is approved by the US Food and Drug Administration for the maintenance of abstinence, participants in the parent study were required to have at least 3 days of abstinence before the randomization/baseline visit. These 3 days of abstinence for each participant were removed to reflect a more natural course of participant alcohol use. Thus, using the 87 days of the TLFB data, a daily dichotomous variable of any alcohol use was created for each participant for the trajectory analysis. Final trajectory classes were chosen based on fit to the data as assessed by the Schwartz Bayesian criterion and having at least 5% of participants in each trajectory class. A categorical variable of trajectory classes was created to compare sociodemographic and clinical characteristics of participants in each class using the χ^2 test (or the Fisher's exact test if the expected count[s] were <5), and analysis of variance with Tukey honestly significant difference post hoc tests (Welch's analysis of variance was used if variances were unequal). Based on the work of Nagin,[33] PROC TRAJ, which was developed by Jones and colleagues,[34] was used to identify trajectory classes.

In addition, growth curve models were run whereby identified trajectory classes, treatment arm (acamprosate or placebo), and time (screening/baseline, weeks 2, 6, and 12) were entered as fixed effects and their interactions examined. The longitudinal covariance matrices were specified as unstructured, and time was not specified as random slopes because of the small sample size. Likewise, other variables were unable to be entered as fixed effects because of the small sample size. The PDA and %HDD outcome variables were arcsine transformed before analysis because of positive skew, and all available TLFB data were used, including up until the point of drop out if participants did not complete the parent study (19% attrition). Because the treatment arm variable (acamprosate or placebo) was not statistically significant in either alcohol use outcome analysis, the variable was removed from the models and the drinking goal added. For all statistically significant growth curve model results, Cohen's f^2 was used to calculate effect sizes (0.02 was considered a small effect, 0.15 a medium effect, and 0.35 a large effect[35]). SAS Mixed Procedure 9.4 (SAS Inc., Cary, NC) was used to run the growth curve models.[36,37]

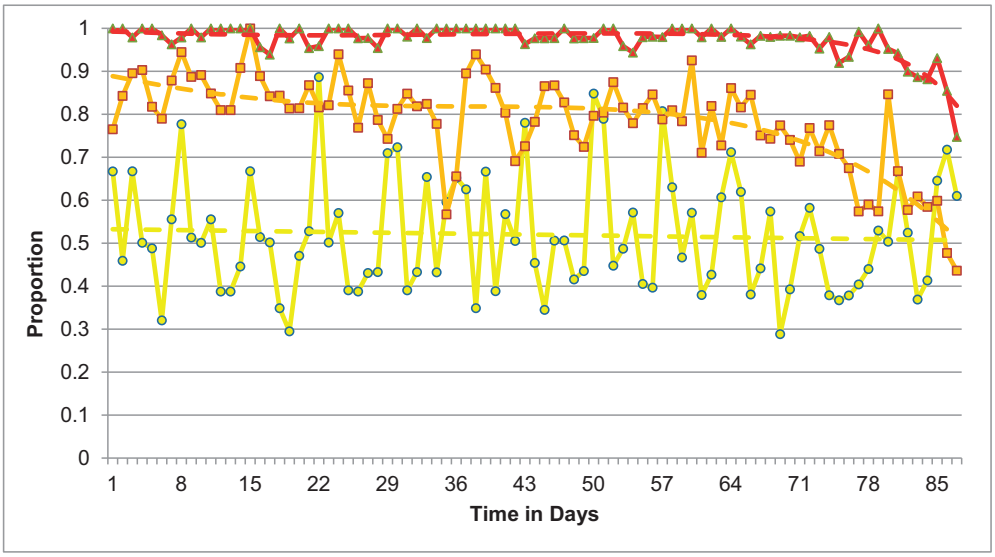
Results

Three distinct trajectory classes of pretreatment alcohol use were identified: frequent drinkers, representing 21% of participants, had a 52% average probability of any alcohol use on a given day (linear trend over time); nearly daily drinkers, representing 28.5% of participants, had a 78% average probability of any drinking on a given day (cubic trend over time); and consistent daily drinkers, representing 50.5% of participants, had a 97% average probability of any alcohol use on a given day (cubic trend over time) (entropy was 0.96[38]; Figure 1). Both nearly daily and consistent daily drinkers notably reduced their alcohol use before the required 3 days of abstinence before the randomization/baseline visit, whereas the drinking pattern of frequent drinkers remained relatively unchanged before randomization.

To describe participants in these trajectories, Table 1 presents the sociodemographic and clinical characteristics, including screening PDA and

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

Figure 1. Probability of any alcohol use over time before screening by trajectory class (n = 100). Group percentages are 21% for frequent drinkers (yellow), 28.5% for nearly daily drinkers (orange), and 50.5% for consistent daily drinkers (red). The lines and markers represent the observed probability of any alcohol use among participants within each trajectory class on each day during the screening period. Dotted lines represent the predicted probability of any alcohol use among participants within each trajectory class on a given day during the screening period.



%HDD, of participants in each of the 3 trajectory classes. Frequent (81%) and consistent daily drinkers (62.8%) were more likely to be male than female when compared with nearly daily drinkers (46.4%), and consistent daily drinkers (58.8%) were more likely to have a college education than both frequent (28.6%) and nearly daily drinkers (39.3%). Frequent drinkers (61.9%) also were less likely to be physiologically dependent on alcohol in comparison with both nearly daily (83.3%) and consistent daily drinkers (89.6%). Consistent daily drinkers (23.5%) were less likely to select a drinking goal of abstinence versus a reduction in alcohol use in comparison to both frequent (50%) and nearly daily drinkers (53.6%). Furthermore, frequent drinkers (mean, 42.7 years; SD, 7.3 years) were statistically younger, on average, than consistent daily drinkers (mean, 48.6 years; SD, 8.0 years), and all 3 trajectory classes were statistically different from one another on both screening PDA—a mean (SD) 51.0 (8.9), 26.4 (7.4), and 6.4 (3.0) for frequent, nearly daily, and consistent daily drinkers, respectively—and %HDD, with 42.1 (10.5), 60.0 (16.2), and 80.0 (23.3) for frequent, nearly daily, and consistent daily drinkers, respectively.

Table 2 presents the results of the growth curve models of trajectory class, drinking goal, and time for PDA and %HDD. There was a significant 3-way interaction of trajectory class, drinking goal, and time ($F(2,284) = 7.54$; $f^2 = 0.05$; 95% confidence interval [CI], 0.03–0.33) for PDA (Figure 2A and B). Participants within each trajectory class with a drinking goal of abstinence relative to a reduction in alcohol use had higher average PDA over time. Interaction contrasts, however, revealed no significant difference between frequent and nearly daily drinkers across the 2 levels of drinking goal over time (based on both linear and quadratic trends), but consistent daily drinkers were significantly different from frequent and nearly daily drinkers (these 2 classes averaged) ($F(1,277) = 20.59$, $P < .001$ for linear trend; $F(1,268) = 10.37$, $P < .01$ for quadratic trend). That is, consistent daily drinkers with a goal of abstinence experienced a significant, positive change on PDA over time (mean PDA, 5.0 [SD, 1.1] at screening/baseline to 80.1 [31.3] at week 12) when compared with their

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

Table 1. Sociodemographic and Clinical Characteristics of the Three Trajectory Classes at Screening (n = 100)

	Frequent Drinkers (n = 21)	Nearly Daily Drinkers (n = 28)	Consistent Daily Drinkers (n = 51)
Sex*			
Male	81.0	46.4	62.8
Female	19.0	53.6	37.2
Race/ethnicity†			
Nonminority	85.7	96.3	92.2
Minority	14.3	3.7	7.8
College education*			
Yes	28.6	39.3	58.8
No	71.4	60.7	41.2
Married			
Yes	61.9	57.1	66.7
No	38.1	42.9	33.3
Current tobacco use			
Yes	57.1	53.6	33.3
No	42.9	46.4	66.7
Family history of alcoholism†			
Yes	90.0	92.6	96.0
No	10.0	7.4	4.0
Previous alcohol treatment			
Yes	60.0	60.0	37.5
No	40.0	40.0	62.5
Severity of alcohol dependence†			
Mild	5.0	11.1	8.5
Moderate	95.0	70.4	68.1
Severe	0.0	18.5	23.4
Physiological dependence*†			
Yes	61.9	83.3	89.6
No	38.1	16.7	10.4
GGT level			
High	23.8	33.3	40.0
Normal	76.2	66.7	60.0
Drinking goal*			
Abstinence	50.0	53.6	23.5
Reduction in use	50.0	46.4	76.5
Condition			
Acamprosate	47.6	53.6	51.0
Placebo	52.4	46.4	49.0
Age (years)*	42.7 (7.3)	47.8 (7.7)	48.6 (8.0)
Duration of alcohol use (years)	24.4 (8.5)	26.6 (8.1)	26.5 (10.4)
AUDIT total score	23.0 (5.6)	24.0 (5.9)	22.4 (5.2)
CAGE total score	2.7 (1.0)	3.0 (0.8)	2.6 (0.7)
CGI score	2.8 (1.5)	3.7 (1.5)	3.5 (1.8)
Percent days abstinent‡	51.0 (8.9)	26.4 (7.4)	6.4 (3.0)
Percent heavy drinking days‡	42.1 (10.5)	60.0 (16.2)	80.0 (23.3)

Data are either a percentage or mean (standard deviation). All sociodemographic and clinical characteristic variables had ≤7% missing data with the exception of previous treatment, which had 28% missing data.
*$P < .05$.
†Fisher exact test.
‡$P < .001$.
AUDIT, Alcohol Use Disorders Identification Test; CGI, Clinical Global Impression Scale.

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

Table 2. Growth Curve Models of Trajectory Class, Drinking Goal, and Time on Percent Days Abstinent and Percent Heavy Drinking Days (n = 100)

	PDA				%HDD			
Variables	Num *df*	Den *df*	*F*	*P*	Num *df*	Den *df*	*F*	*P*
Trajectory class	2	216	9.75	<.001	2	216	6.76	<.01
Drinking goal	1	216	5.56	<.05	1	216	0.26	.61
Time	1	284	89.5	<.001	1	284	128.5	<.001
Trajectory class × drinking goal	2	216	0.02	.98	2	216	0.08	.92
Trajectory class × time	2	284	4.15	<.05	2	284	3.23	<.05
Drinking goal × time	1	284	11.67	<.01	1	284	6.63	<.05
Trajectory class × drinking goal × time	2	284	7.54	<.01	2	284	2.14	.12

%HDD, percent heavy drinking days; PDA, percent days abstinent; Num *df*, numerator degrees of freedom; Den *df*, denominator degrees of freedom.

counterparts with a goal of reduction in alcohol use (mean PDA, 6.9 [SD, 3.2] at screening/baseline to 26.1 [30.3] at week 12) as compared with the combination of both frequent and nearly daily drinkers (mean PDA, 39.2 [SD, 16.8] at screening/baseline to 79.1 [23.9] at week 12 for frequent and nearly daily drinkers with a goal of abstinence, and 34.1 [12.0] at screening/baseline to 63.8 [31.0] at week 12 for frequent and nearly daily drinkers with a goal of alcohol use reduction). Participants in all 3 trajectory classes, regardless of drinking goal, also increased the most on PDA between baseline and study week 2.

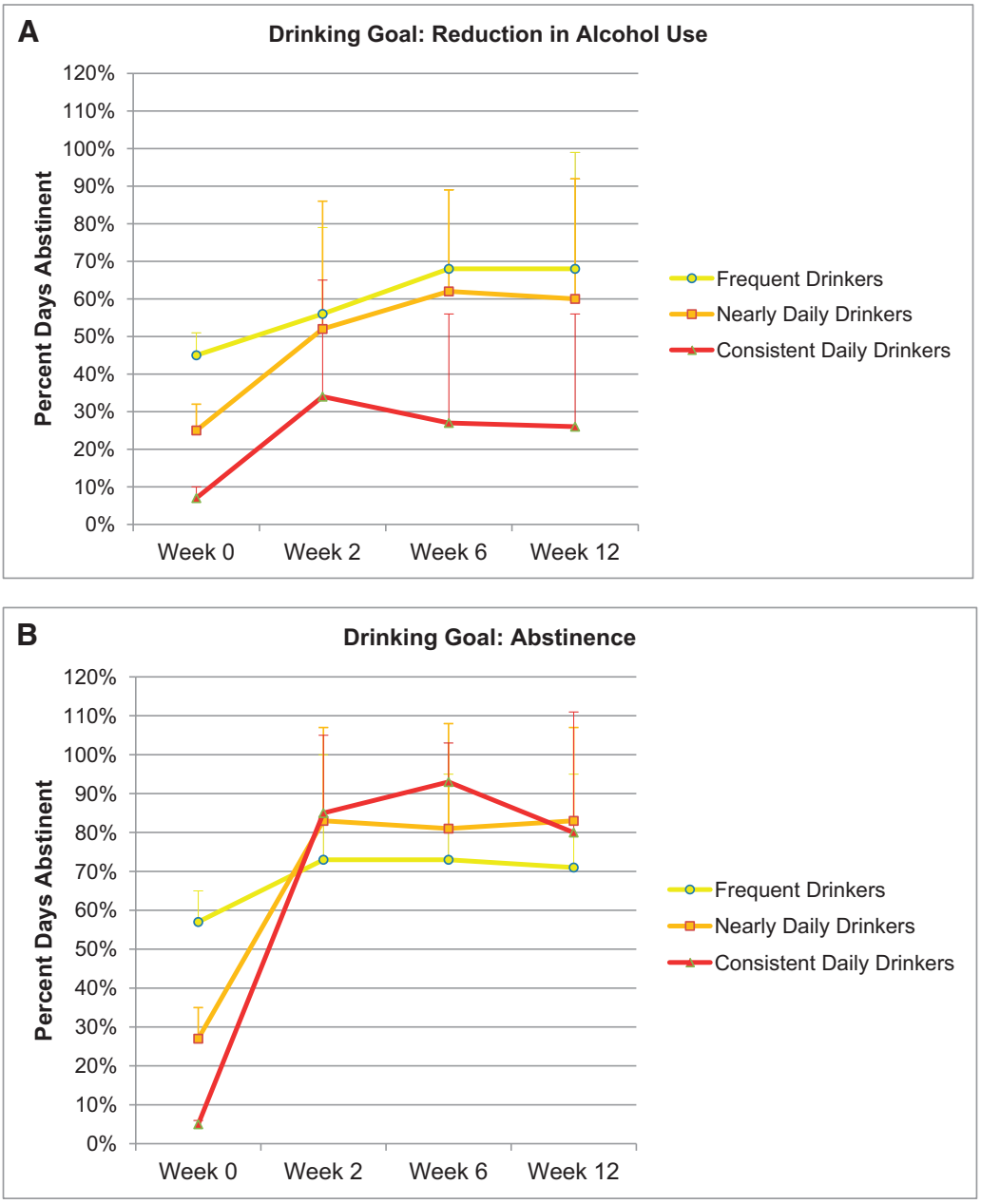
There was a significant 2-way interaction of trajectory class and time ($F(2,284) = 3.23$; $f^2 = 0.02$; 95% CI, 0.00–0.19) for %HDD (Figure 3). Frequent and nearly daily drinkers, relative to consistent daily drinkers, achieved approximately the same levels of average improvement in reducing %HDD over time, and interaction contrasts revealed this difference to be significant ($F(1,276) = 6.01$, $P < .05$ for linear trend; $F(1,268) = 16.63$, $P < .001$ for quadratic trend). That is, consistent daily drinkers had higher average %HDD over time (mean [SD] of 80.0% [23.3%] at screening/baseline to 32.4% [35.0%] at week 12) when compared with the combination of both frequent and nearly daily drinkers (52.4 [16.6%] at screening/baseline to 13.4% [20.8%] at week 12). In addition, participants in all 3 trajectory classes decreased the most on %HDD between baseline and study week 2. There was also a significant 2-way interaction of drinking goal and time ($F(1,284) = 6.63$; $f^2 = 0.04$; 95% CI, 0.03–0.21) for %HDD (Figure 4). Participants with a drinking goal of abstinence relative to a reduction in alcohol use had lower average %HDD over time (66.0% [23.4%] at screening/baseline to 11.3% [22.0%] at week 12 for participants with a goal of abstinence, and 67.2% [25.2%] at screening/baseline to 31.0% [33.0%] at week 12 for participants with a goal of alcohol use reduction); interaction contrasts revealed this difference to be significant ($F(1,278) = 10.52$, $P < .01$ for linear trend; $F(1,268) = 15.47$, $P < .001$ for quadratic trend). Participants, regardless of drinking goal, also decreased the most on %HDD between baseline and study week 2.

Discussion

The results of this secondary analysis reveal that both trajectories of alcohol use and endorsed drinking goal before treatment affect alcohol use outcomes for patients with an alcohol use disorder when treated with brief behavioral counseling in the context of a clinical trial in a primary care setting. The 3 identified trajectory classes of pretreatment alcohol use in this study behaved similarly to 3 of 5 trajectory classes identified in previous work by Gueorguieva and colleagues[18] and thus were titled the same: frequent drinkers, nearly daily drinkers, and consistent daily drinkers. Most notably, consistent daily drinkers who endorsed a goal of abstinence had about a two-thirds gain in PDA over time versus their counterparts who wanted to reduce their alcohol use. A drinking goal of abstinence for individuals who are consuming alcohol on a consistent daily basis may have the ability to modify PDA in a positive direction. Although consistent daily drinkers had significantly higher %HDD than frequent and nearly daily drinkers over time, participants, including consistent daily

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

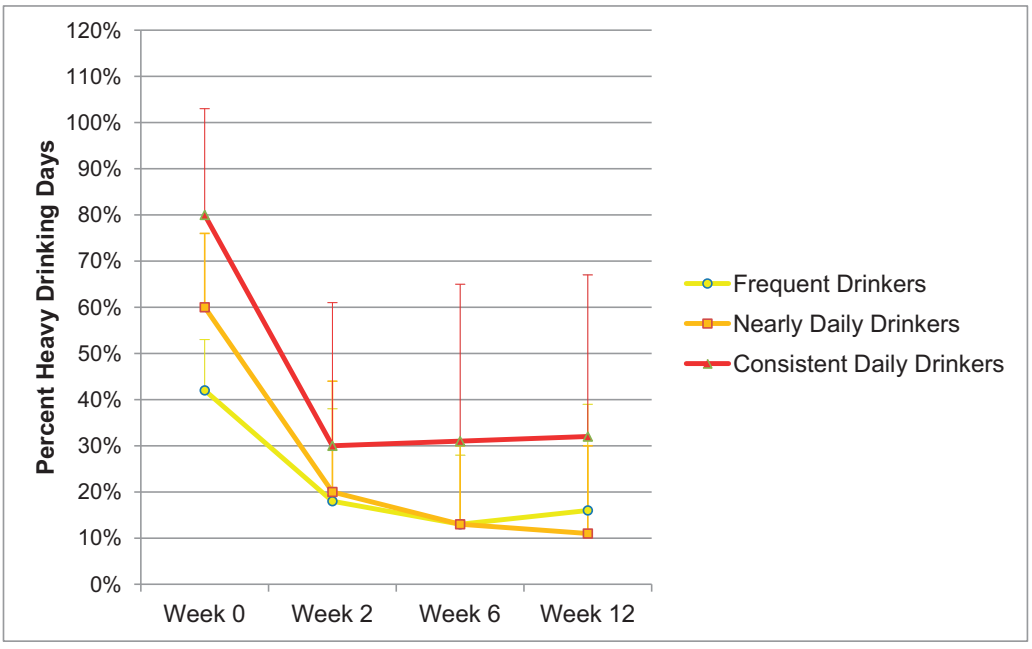
Figure 2. Pretreatment goals of reduction in alcohol use (n = 62) (A) and abstinence (n = 37) (B) by trajectory classes over time on percent days abstinent (untransformed). Error bars represent the standard deviation.



drinkers, who endorsed a goal of abstinence versus a reduction in alcohol use had about one-third the %HDD over time. A drinking goal of abstinence seems to be associated with reductions in %HDD—a positive outcome beyond gains in PDA only such that those participants with a goal of abstinence had, on average, slightly >10% HDD at week 12 (compared with an average of 66% HDD at screening/baseline). Finally, the trajectory classes did not interact with acamprosate on either PDA or %HDD, and because of the small sample size, we—unlike Gueorguieva and colleagues[18]—were unable to consider the outcome measure of abstinence from heavy drinking during the past 2 months of treatment. That is, Gueorguieva and colleagues[18] found that frequent drinkers who received acamprosate were more likely to abstain from heavy drinking during this time period.

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

Figure 3. Pretreatment trajectory classes over time on percent heavy drinking days (untransformed; n = 100). Error bars represent the standard deviation.

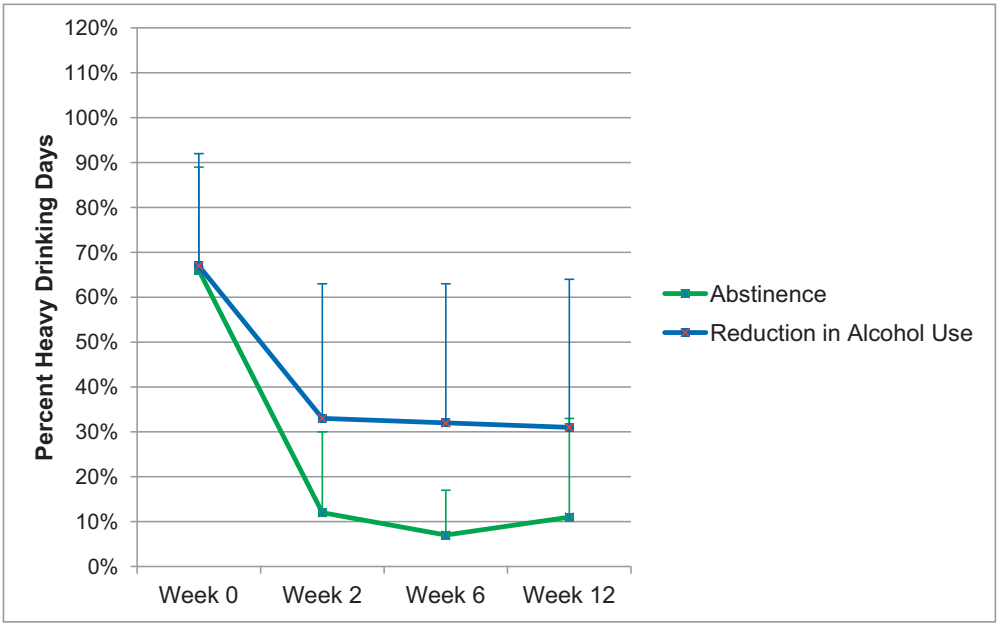


Practical Implications

Based on our results, there may be value to assessing drinking trajectories among patients in a primary care setting who need treatment for an alcohol use disorder. Assessing such trajectories may potentially be accomplished through the administration of alcohol use frequency measures, though no formal instrument to do this has yet been developed. Positive changes in drinking behavior often occur before the start of treatment, and capturing such pretreatment change via trajectories may allow for a fuller picture of the change process.[39] Furthermore, drinking goal before treatment, which was assessed in the parent study via simple verbal inquiry, also seems to be clinically meaningful. That is, patients with a goal of abstinence may be more responsive to alcohol use disorder treatment in a primary care setting,[14] which seems to be the case in alcohol treatment settings as well.[13,15–17] It should also be noted that pretreatment alcohol use seems to be associated with pretreatment drinking goal. Both frequent and nearly daily drinkers versus consistent daily drinkers were more likely to select a goal of abstinence; yet, based on our growth curve models, consistent daily drinkers with a goal of abstinence made significantly notable gains in PDA, which may be a counterintuitive finding given the frequency of drinking among participants in this trajectory class. Specifically, consistent daily drinkers with a goal of abstinence had an average of 5% of days abstinent at screening/baseline, which was similar to the average of 7% of days abstinent at screening/baseline for consistent daily drinkers with a goal of reduction in alcohol use. At the end of treatment (week 12), however, consistent daily drinkers with a goal of abstinence had an average of 80% of days abstinent when compared with an average of 26% of days abstinent for consistent daily drinkers with a goal of reduction in alcohol use. Furthermore, although consistent daily drinkers and the combination of both frequent and nearly daily drinkers with a goal of abstinence, who had an average of 39% of days abstinent at screening/baseline, ended treatment (week 12) with essentially the same outcome—80% PDA for consistent daily drinkers and 79% PDA for the combination of frequent and nearly daily drinkers—consistent daily drinkers with a goal of abstinence made greater strides in achieving PDA from screening/baseline. Finally, our results reveal that most patient change on both PDA and %HDD occurred within the first 2 weeks of treatment and was more or less maintained until study end, thereby suggesting that positive change may be able to happen in a short period of time in a primary care setting. The longer-term maintenance of

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

Figure 4. Pretreatment goal of abstinence versus a reduction in alcohol use on percent heavy drinking days (untransformed; n = 99). Error bars represent the standard deviation. Used with permission from ref. 14. Copyright © 2013 Wiley.



such change in a primary care setting, however, is unknown.

Treatment of Alcohol Use Disorder by Primary Care Physicians

Given the interest in primary care settings as locations in which to address alcohol misuse, and the recent interest in integrated care for individuals with co-occurring substance use, mental health conditions, and medical conditions,[40,41] primary care physicians will likely become more involved in the treatment of individuals with an alcohol use disorder, assuming such patients are not too ill. The results of this secondary analysis draw attention to the role of drinking goal in a primary care setting. Specifically, a goal of abstinence may be an important moderator for a good outcome in a primary care setting. It will be important to understand through future research how patients arrive at such a goal, and equally important to understand how primary care physicians can facilitate patients toward such a goal. Unlike trajectories of pretreatment alcohol use, treatment interventions may allow a physician to address and negotiate a drinking goal with patients.[42–46] But, will a negotiated goal of abstinence have the same positive outcome as a "natural" goal of abstinence, as seen in these findings? Potential interventions to help patients move toward a goal of abstinence include motivational interviewing,[42] the sobriety sampling procedure[43] of the community reinforcement approach,[44] and practitioner acceptance of a moderation goal,[45] which, when accepted, may lead to an abstinence goal, as detailed in behavioral self-control training.[45,46] Although to date there is no evidence of the efficacy of brief intervention for patients with alcohol dependence or very heavy drinking in primary care as identified by screening,[9] certain aspects that may make opportunistic brief intervention successful for individuals without an alcohol use disorder in primary care may also be relevant for the management of primary care patients with an alcohol use disorder. In particular, one important aspect may be the existence of an established patient–physician relationship (in which rapport and trust exist[47]) in which to implement effective alcohol use disorder treatment.

An important component of this study is that participants took pills throughout the parent study, and because of how acamprosate is administered, this consisted of taking 2 pills 3 times a day. This represents an intervention regardless of pharmacology, and in fact, no effect of acamprosate was found. In an intriguing analysis of the effect of

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

placebo from the COMBINE study, which was a multisite, randomized, double-blind, placebo-controlled study of the combination of acamprosate and naltrexone and behavioral interventions for alcohol dependence, Weiss and colleagues,[48] demonstrated that participants assigned to placebo and a lower level of behavioral intervention, medical management, had significantly higher PDA than participants assigned to more intense behavioral therapy without any pills. Retention in the COMBINE study also was higher among those receiving placebo plus medical management than in the no-pill group.[48] This points to the potentially powerful effect of taking a pill and suggests that patients with a goal of abstinence who receive medication in a primary care setting may be able to achieve substantial improvements in alcohol use outcomes.

Study Limitations

Limitations to this study include exploratory analyses, a small sample size, associations only, and generalizability. Measurement issues also exist in that drinking goal was only measured before study enrollment and may have changed during the course of treatment, which could affect outcomes. In addition, readiness to change alcohol use was not measured in the parent study and therefore could not be used in our analyses. Specifically, for example, taking action to change has been found to predict less drinking among hospitalized medical patients with risky alcohol use,[49] a group in which a large proportion have an alcohol use disorder.[50] The generalizability of findings may also be limited because most participants in the parent study were recruited via advertisement to keep a steady flow of participants enrolled, and those with a history of alcohol withdrawal seizures or delirium tremens were excluded; therefore, findings may not be typical of patients with an alcohol use disorder who are seen in primary care. In addition, although there was no effect of acamprosate found in the parent study, the effect of the brief behavioral counseling alone in this study could not be determined because all participants were taking either acamprosate or matching placebo pills. Finally, there was no treatment follow-up in the parent study; therefore, the durability of findings in our study could not be examined.

Conclusion

Patients with an alcohol use disorder who have a drinking goal of abstinence, especially consistent daily drinkers, and who receive medication and brief behavioral counseling may maximally benefit from alcohol use disorder treatment in a primary care setting.

The authors thank Dr. Richard Saitz for his insightful review and critique of this article.

References

1. Babor TF, Grant M, eds. Background to the study. In: Project on identification and management of alcohol-related problems. Report on phase II: a randomized clinical trial of brief intervention in primary health. Geneva: World Health Organization; 1992: 5–14. Available from: http://whqlibdoc.who.int/hq/1991/WHO_PSA_91.5.pdf?ua=1. Accessed March 20, 2014.
2. Institute of Medicine. Broadening the base of treatment for alcohol problems. Washington, DC: National Academies Press; 1990. Available from: http://www.nap.edu/openbook.php?isbn=0309040388. Accessed March 20, 2014.
3. Saitz R. Unhealthy alcohol use. N Engl J Med 2005; 352:596–607.
4. Kaner EF, Dickinson HO, Beyer F, et al. The effectiveness of brief alcohol interventions in primary care settings: a systematic review. Drug Alcohol Rev 2009;28:301–23.
5. Edwards G. The evil genius of the habit: DSM-5 seen in historical context. J Stud Alcohol Drugs 2012;73:699–701.
6. Willenbring ML, Massey SH, Gardner MB. Helping patients who drink too much: an evidence-based guide for primary care clinicians. Am Fam Physician 2009;80:44–50.
7. Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text revision. Washington, DC: American Psychological Association; 2000.
8. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. Arlington, VA: American Psychiatric Publishing; 2013.
9. Saitz R. Alcohol screening and brief intervention in primary care: absence of evidence for efficacy in people with dependence or very heavy drinking. Drug Alcohol Rev 2010;29:631–40.
10. Malet L, Reynaud M, Llorca PM, Chakroun N, Blanc O, Falissard B. Outcomes from primary care management of alcohol dependence in France. J Subst Abuse Treat 2009;36:457–62.
11. Kiritzé-Topor P, Huas D, Rosenzweig C, Comte S, Paille F, Lehert P. A pragmatic trial of acamprosate in the treatment of alcohol dependence in primary care. Alcohol Alcohol 2004;39:520–7.

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

12. O'Malley SS, Rounsaville BJ, Farren C, et al. Initial and maintenance naltrexone treatment for alcohol dependence using primary care vs. specialty care: a nested sequence of 3 randomized trials. Arch Intern Med 2003;163:1695–704.
13. Adamson SJ, Heather N, Morton V, Raistrick D; UKATT Research Team. Initial preference for drinking goal in the treatment of alcohol problems: II. Treatment outcomes. Alcohol Alcohol 2010;45:136–42.
14. Berger L, Fisher M, Brondino M, et al. Efficacy of acamprosate for alcohol dependence in a family medicine setting in the United States: a randomized, double-blind, placebo-controlled study. Alcohol Clin Exp Res 2013;37:668–74.
15. Bujarski S, O'Malley SS, Lunny K, Ray LA. The effects of drinking goal on treatment outcome for alcoholism. J Consult Clin Psychol 2013;81:13–22.
16. Mowbray O, Krentzman AR, Bradley JC, Cranford JA, Robinson EA, Grogan-Kaylor A. The effect of drinking goals at treatment entry on longitudinal alcohol use patterns among adults with alcohol dependence. Drug Alcohol Depend 2013;132:182–8.
17. Gueorguieva R, Wu R, O'Connor PG, et al. Predictors of abstinence from heavy drinking during treatment in COMBINE and external validation in PREDICT. Alcohol Clin Exp Res 2014;38:2647–56.
18. Gueorguieva R, Wu R, Donovan D, et al. Baseline trajectories of drinking moderate acamprosate and naltrexone effects in the COMBINE study. Alcohol Clin Exp Res 2011;35:523–31.
19. CAMPRAL (acamprosate calcium) delayed-release tablets. Highlights of prescribing information. Revised January 2012. Available from: http://pi.actavis.com/data_stream.asp?product_group=1928&p=pi&language=E. Accessed August 28, 2014.
20. 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.
21. Miller WR, ed. COMBINE Monograph Series, volume 1. Combined behavioral intervention manual: a clinical research guide for therapists treating people with alcohol abuse and dependence. DHHS publication no. (NIH) 04–5288. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2004.
22. NIDA Center for Genetic Studies. Structured clinical interview for DSM-IV, version 2.0. Alcohol use disorder 1998.
23. Sobell LC, Sobell MB. Timeline follow-back: a technique for assessing self-reported ethanol consumption. In Allen J, Litten RZ, eds. Measuring alcohol consumption: psychosocial and biological methods. Clifton, NJ: Humana Press; 1992:41–72.
24. Sobell LC, Maisto SA, Sobell MB, Cooper AM. Reliability of alcohol abusers' self-reports of drinking behavior. Behav Res Ther 1979;17:157–60.
25. National Institute on Alcohol Abuse and Alcoholism. Helping patients who drink too much: a clinician's guide. NIH publication no. 07–3739. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health; 2005.
26. Sobell LC, Sobell MB. Instructions for filling out the timeline alcohol use calendar. 2000. Available from: http://www.nova.edu/gsc/forms/TLFBAlcoholinstructions.pdf. Accessed November 13, 2015.
27. Allen JP, Sillanaukee P, Strid N, Litten RZ. Biomarkers of heavy drinking. In Allen JP, Wilson VB, eds. Assessing alcohol problems: a guide for clinicians and researchers, 2nd ed. Bethesda, MD: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism; 2003:37–53.
28. 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.
29. Ewing JA. Detecting alcoholism: the CAGE questionnaire. JAMA 1984;252:1905–7.
30. Guy W. The Clinical Global Impression Scale. In ECDEU assessment manual for psychopharmacology revised. Rockville, MD: U.S. Department of Health, Education, and Welfare, Alcohol, Drug Abuse, and Mental Health Administration, National Institute of Mental Health, Psychopharmacology Research Branch; 1976:218–22.
31. Mann RE, Sobell LC, Sobell MB, Pavan D. Reliability of a family tree questionnaire for assessing family history of alcohol problems. Drug Alcohol Depend 1985;15:61–7.
32. Andruff H, Carraro N, Thompson A, Gaudreau P, Louvet B. Latent class growth modelling: a tutorial. Tutor Quant Methods Psychol 2009;5:11–24.
33. Nagin DS. Analyzing developmental trajectories: a semiparametric, group-based approach. Psychol Methods 1999;4:139–57.
34. Jones BL, Nagin DS, Roeder K. A SAS procedure based on mixture models for estimating developmental trajectories. Sociol Method Res 2001;29:374–93.
35. Cohen J. Statistical power analysis for the behavioral sciences, 2nd ed. Mahwah, NJ: Lawrence Erlbaum Associates; 1988.
36. Ferron JM, Hogarty KY, Dedrick RF, Hess MR, Niles JD, Kromrey JD. Reporting results from multilevel analyses. In O'Connell A, McCoach B, eds. Multilevel analysis of education data. Charlotte, NC: Information Age Publishing; 2008:391–426.
37. Singer JD. Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. J Educ Behav Stat 1998;23:323–55.

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.

38. Muthén BO. Mplus technical appendices. Los Angeles, CA: Muthén & Muthén; 1998–2004.
39. Stasiewicz PR, Schlauch RC, Bradizza CM, Bole CW, Coffey SF. Pretreatment changes in drinking: relationship to treatment outcomes. Psychol Addict Behav 2013:27;1159–66.
40. Sterling S, Chi F, Hinman A. Integrating care for people with co-occurring alcohol and other drug, medical, and mental health conditions. Alcohol Res Health 2011:33;338–49.
41. Croft B, Parish SL. Care integration in the Patient Protection and Affordable Care Act: implications for behavioral health. Adm Policy Ment Health 2013:40; 258–63.
42. Miller WR, Rollnick S. Motivational interviewing: helping people change, 3rd ed. New York: Guilford Press; 2012.
43. Smith JE, Meyers RJ, Milford JL. Community reinforcement approach and community reinforcement and family training. In Hester RK, Miller WR, eds. Handbook of alcoholism treatment approaches: effective alternatives, 3rd ed. Boston, MA: Allyn and Bacon; 2002:237–58.
44. Hunt GM, Azrin NH. A community-reinforcement approach to alcoholism. Behav Res Ther 1973:11; 91–104.
45. Hester RK. Behavioral self-control training. In Hester RK, Miller WR, eds. Handbook of alcoholism treatment approaches: effective alternatives, 3rd ed. Boston, MA: Allyn and Bacon; 2002:152–64.
46. Sanchez-Craig M, Annis HM, Bornet AR, MacDonald KR. Random assignment to abstinence and controlled drinking: evaluation of a cognitive-behavioral program for problem drinkers. J Consult Clin Psychol 1984:52;390–403.
47. Saitz R. Discussant. Challenges of implementing alcohol screening and brief interventions in health care. In Drummond C, Deluca P, chairs. Symposium at the 33rd Annual Research Society on Alcoholism Scientific Meeting, June 2010, San Antonio, TX.
48. Weiss RD, O'Malley SS, Hosking JD, Locastro JS, Swift R, COMBINE Study Research Group. Do patients with alcohol dependence respond to placebo? Results from the COMBINE Study. J Stud Alcohol Drugs 2008:69;878–84.
49. Bertholet N, Cheng DM, Palfai TP, Samet JH, Saitz R. Does readiness to change predict subsequent alcohol consumption in medical inpatients with unhealthy alcohol use? Addict Behav 2009:34;636–40.
50. 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.

J Am Board Fam Med: first published as 10.3122/jabfm.2016.01.150143 on 14 January 2016. Downloaded from http://www.jabfm.org/ on 19 May 2022 by guest. Protected by copyright.