Evaluation of an Electronic Clinical Reminder to Facilitate Brief Alcohol-Counseling Interventions in Primary Care*

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ABSTRACT. Objective: Brief intervention for patients with unhealthy alcohol use is a prevention priority in the United States, but most eligible patients do not receive it. This study evaluated an electronic alcohol-counseling clinical reminder at a single Veterans Affairs general medicine clinic. **Method:** The systems-level intervention evaluated in this study consisted of making the clinical reminder, which facilitated medical record documentation of brief intervention among patients who screened positive for unhealthy alcohol use, available to providers on one (of two) randomly selected hallways. Secondary electronic data were extracted for all patients who visited the clinic (October 1, 2002, to September 30, 2005). The proportion of patients with clinical-reminder use was evaluated among patients who screened positive for unhealthy drinking and were assigned to intervention hallway providers ("descriptive cohort"). Adjusted logistic regression evaluated the association between the intervention and resolution of unhealthy drinking at follow-up among all screen-positive patients who completed a second Alcohol Use Disorders Identification Test Consumption questionnaire 18 months or longer after the first ("outcomes cohort"). **Results:** Eligible patients (N = 22,863) included 10,392 controls and 12,471 in the intervention group. Fifteen percent (398 of 2,640) of descriptive cohort patients with unhealthy drinking had clinical-reminder use, which varied by severity (14% [n = 302 of 2,165] with mild/moderate and 20% [n = 96 of 475] with severe unhealthy drinking, p = .001). Only 39% (156 of 398) of patients with clinical-reminder use had documented brief intervention; advice to abstain was most common. Access to the clinical reminder was not significantly associated with resolution of unhealthy drinking in 1,358 patients in the outcomes cohort. **Conclusions:** Availability of a clinical reminder to facilitate brief intervention did not, alone, result in substantial use of the clinical reminder. More active implementation efforts may be needed to get brief interventions onto the agenda of busy primary care providers. (*J. Stud. Alcohol Drugs, 71,* 720-725, 2010)

BRIEF ALCOHOL INTERVENTIONS, which are generally patient-centered and include advice to reduce or abstain from drinking and feedback linking alcohol use to health (Whitlock et al., 2004), reduce drinking in primary care patients with unhealthy alcohol use (Kaner et al., 2007) and are considered the third highest prevention priority for U.S. adults (Solberg et al., 2008). However, no system has implemented brief alcohol interventions into routine clinical practice (Nilsen et al., 2006).

The Veterans Affairs (VA) health care system has used algorithm-based "clinical reminders" embedded into the electronic medical record to prompt, document, and monitor evidence-based care (Saleem et al., 2005). We developed an electronic clinical reminder to encourage providers to offer brief interventions to patients who screened positive for unhealthy alcohol use and to facilitate documentation. A previous observational evaluation at an eight-clinic VA health care facility where providers routinely used clinical reminders

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demonstrated that the reminder was used frequently and was associated with improvements in alcohol screening scores at follow-up (Williams et al., 2010). It is unknown whether results are generalizable to settings in which providers do not routinely use reminders.

The present report describes a pilot study of the alcohol-counseling clinical reminder, which took place in a naturalistic real-life clinical setting without any direct study contact or recruitment with patients and providers. The aims of this study were to (a) describe the frequency of clinical-reminder use and evaluate whether use differed based on the severity of unhealthy alcohol use among patients with positive alcohol screening ("descriptive cohort") and (b) identify whether a systems-level intervention (offering providers access to the clinical reminder) was associated with decreases in alcohol screening scores at follow-up among a small subsample of patients with repeat screening ("outcomes cohort").

Method

This study included all providers practicing in a VA primary care clinic and the patients who visited them between October 1, 2002, and September 30, 2005; participants were not actively recruited. At the time of this study, the VA had a national performance measure for alcohol screening but not for follow-up on those who screened positive. Providers in the study clinic were prompted by an alcohol-screening clinical reminder to screen patients annually for unhealthy alcohol use with the Alcohol Use Disorders Identification Test Consumption (AUDIT-C) questionnaire (a task largely completed by triage staff). However, during the study period, there were no provider incentives for alcohol screening in the study clinic, and the proportion of patients who were screened is unknown. The intervention evaluated in this study consisted of (a) implementing an alcohol-counseling clinical reminder triggered by a positive alcohol screen for providers on one randomly selected hallway ("intervention hallway") and (b) sending one email alerting providers on that hallway of the new clinical reminder. The study protocol, including a waiver of consent, was approved by institutional review boards at the University of Washington and VA Puget Sound Health Care System.

Electronic clinical and administrative data were extracted for all patients who visited clinic providers during the study. If patients only had visits to providers practicing on one hallway, they were assigned to that hallway (intervention or control). If they had visits to both, they were assigned to the hallway to which they had more visits. Designation of "primary care provider" was made based on electronic data indicating patients' assignments to a particular provider. For patients with no assignment (15%), primary care provider was designated based on number of visits.

The AUDIT-C screening thresholds that were used to identify unhealthy alcohol use at the time of this study were those that balanced sensitivity and specificity in validation studies (Bradley et al., 2007; Bush et al., 1998): Male patients with scores of 4-7 and female patients with scores of 3-7 were considered to screen positive for mild/moderate unhealthy alcohol use, and patients with scores of 8-12 were considered to screen positive for severe unhealthy alcohol use. Patients were considered to have resolved unhealthy alcohol use at follow-up if they screened negative (scores of ≤2 women and ≤3 men) on a follow-up AUDIT-C (obtained ≥18 months after the first test) with a decrease in score of at least 2 points.

As in the previous study, the alcohol-counseling clinical reminder was designed to prompt providers to offer alcohol counseling and document the care provided. Each aspect of care documented in the clinical reminder was stored as a data element in the patient's electronic medical record. Patients were considered to have clinical-reminder use if any data element from the reminder was found in their records, indicating that the clinical reminder was used. Data elements resulting from the reminder were categorized into the following: (a) assessment of prior treatment history and levels of consumption; (b) brief intervention, including any documentation of advice to reduce or abstain from drinking, feedback linking alcohol use to health, and/or agreement on a drinking goal; (c) referral to specialty care; (d) use of optional assessment tools; and (e) documentation in the reminder that alcohol was not addressed during that visit. Use of optional assessment tools included clinical-reminder documentation of assessment for alcohol-use disorders (according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; American Psychiatric Association, 1994), readiness to change, and alcohol-related problems (10-item AUDIT) or a review of alcohol-related laboratory or blood pressure results. Intervention hallway providers—including staff physicians, residents, nurse practitioners, or physician assistants—were considered the *user* of the reminder if they had a visit with the patient the day the clinical reminder was used.

Demographic characteristics included age (<50, 50-64, ≥65 years), sex, race (White, Black, other, unknown), and marital status (married vs. unmarried). Utilization was measured as the number of visits to the patient's assigned hallway. Patients who were 50% or more disabled as a result of military service received VA care without copayments. Inpatient or outpatient International Classification of Diseases, Tenth Revision, diagnoses (World Health Organization, 1992) in the year before screening measured comorbidity and severity of unhealthy alcohol use.

Descriptive analyses were conducted in all eligible patients to identify differences in measured characteristics between intervention and control patients. Remaining analyses were conducted in two separate but overlapping subsamples. Intervention hallway patients were included in a descriptive cohort if they screened positive for unhealthy

alcohol use at any time during the study (thereby making the alcohol-counseling clinical reminder applicable). Patients from both hallways were included in an outcomes cohort if they screened positive for unhealthy alcohol use on an initial AUDIT-C and had a follow-up AUDIT-C at least 18 months after the baseline screen.

Analyses in descriptive cohort patients (*Aim 1*). To describe the frequency of reminder use, rates of any clinical-reminder use and specific types of reminder use were determined among all eligible intervention hallway patients and compared across mild/moderate and severe unhealthy alcohol use using chi-square tests. Rates of clinical-reminder use among patients who saw different types of providers (i.e., from different professional disciplines) were assessed, as were the number and types of providers who used the clinical reminder. Differences in rates of clinical-reminder use across provider type were evaluated using a generalized estimating equation and postestimation *F* test to account for outcomes correlated by provider.

Analyses in outcomes cohort patients (*Aim 2*). Unadjusted and adjusted logistic regression models, clustered on primary care provider, were used to model the association between the intervention (provider access to the clinical reminder) and resolution of unhealthy alcohol use. Adjusted analyses included demographics, utilization, disability resulting from military service, physical and mental comorbidity, baseline AUDIT-C scores, and three other ICD-9–derived measures of severity based on known associations between these measures and both receipt of brief interventions and changes in drinking (Burman et al., 2004; Kaner et al., 2001; Matzger et al., 2005; Weisner et al., 2003). All analyses were conducted using Stata Version 10.1 (StataCorp LP, College Station, TX).

Results

Overall, 22,863 patients had a visit to the clinic during the study period; 10,392 were assigned to the control hallway and 12,471 to the intervention hallway. Patients had a mean age of 58.5 years (*SD* = 14.0), and the majority were male (94%), White (64%), and unmarried (54%). Patients assigned to control and intervention hallways were mostly similar. However, compared with control patients, a slightly higher proportion of intervention patients were female (4% vs. 7%, $p < .001$), and slightly lower proportions of intervention patients screened positive for severe unhealthy alcohol use (4% vs. 3%, $p < .01$) and had diagnoses for substance-use disorders (26% vs. 24%, $p < .01$), medical conditions associated with AUDIT-C scores (30% vs. 28%, $p = .02$), or physical comorbidities (78% vs. 76%, $p < .001$). A total of 4,202 patients (18%) on either hallway screened positive for unhealthy alcohol use on the AUDIT-C during the study period.

Aim 1 results (*descriptive cohort*). Among 2,640 patients assigned to the intervention hallway who screened positive for unhealthy alcohol use during the study period (descriptive cohort), 2,165 (82%) screened positive for mild/moderate and 475 (18%) for severe unhealthy alcohol use. Of the latter group, 285 of 475 (60%) had a substance-use-disorder diagnosis documented in the prior year. A total of 398 of the 2,640 intervention patients with unhealthy alcohol use (15%) had any documented use of the alcohol-counseling clinical reminder, and both reminder use and documented brief interventions were significantly more common in patients with severe unhealthy alcohol use than in those with mild/moderate unhealthy alcohol use (Table 1). The only exception to this was that, by design of the reminder, assessment of treatment history was more common for patients with mild/moderate than severe unhealthy alcohol use. Among patients with any reminder use, advice to abstain was most common and was documented more often for patients with severe unhealthy alcohol use (Table 1).

Patients in the descriptive cohort were assigned to 38 of 88 study providers. Sixteen of these providers (42%) used the alcohol-counseling clinical reminder at least once: 3 (19%) were staff physicians, 2 (13%) were resident physicians, and 11 (69%) were nurse practitioners. Rates of reminder use varied significantly by provider discipline: for patients whose primary care providers were staff physicians ($n = 811$), nurse practitioners ($n = 1{,}001$), physician assistants ($n = 74$), resident physicians ($n = 129$), and unknown ($n = 625$), rates of reminder use were 9%, 23%, 1%, 13%, and 12%, respectively ($p < .001$).

Aim 2 results (*outcomes cohort*). Among the 4,202 patients on either hallway who screened positive for unhealthy alcohol use on an initial AUDIT-C (18% of those screened), 1,358 (32%) had a follow-up AUDIT-C assessment 18 months or longer after baseline (outcomes cohort). Among these 1,358 patients, 42% resolved unhealthy alcohol use at follow-up, including 43% (288 of 666) of control hallway patients and 40% (278 of 692) of intervention hallway patients ($p = .25$). There was no significant association between the intervention and resolution of unhealthy alcohol use in unadjusted or adjusted models (odds ratio [OR] = 0.88, 95% CI [0.68, 1.14], and OR = 0.87, 95% CI [0.68, 1.12], respectively). Results were similar in a post hoc, exploratory analysis restricted to patients assigned to nurse practitioner providers (unadjusted OR = 1.14, 95% [CI 0.76, 1.71]; adjusted OR = 1.16, 95% CI [0.76, 1.77]). Because rates of clinical-reminder use were so low, we also evaluated associations between clinical-reminder use or brief intervention and resolution of unhealthy alcohol use, using the same methods as main analyses. There was no significant increase in resolution of unhealthy alcohol use associated with documented clinical-reminder use (adjusted OR = 0.85, 95% CI [0.52, 1.40]) or brief interventions (adjusted OR = 1.07, 95% CI [0.55, 2.06]).

TABLE 1. Overall and specific use of the alcohol-counseling clinical reminder: Total and compared across groups with mild/moderate and severe unhealthy alcohol use

Variable	Total *n* (%)	Mild/moderate *n* (%)	Severe *n* (%)	*p*
All intervention hallway patients who screened positive for unhealthy alcohol use (descriptive cohort)	(*n* = 2,640)	(*n* = 2,165)	(*n* = 475)	
Specific uses of the clinical reminder				
Assess prior treatment or AA attendance[a]	301 (11)	282 (13)	19 (4)	<.001
Brief intervention	156 (6)	77 (4)	79 (17)	<.001
Referral to specialty care or treatment	19 (1)	11 (1)	8 (2)	.01
Use of optional assessment tools[b]	3 (0)	2 (0)	1 (0)	.49
Alcohol use not addressed today	25 (1)	23 (1)	2 (0)	.19
Any clinical-reminder use	398 (15)	302 (14)	96 (20)	<.01
Intervention hallway patients who screened positive for unhealthy alcohol use and had any documented use of the clinical reminder	(*n* = 398)	(*n* = 302)	(*n* = 96)	
Specific elements of brief intervention documented with the clinical reminder				
Advised to abstain	99 (25)	42 (14)	57 (59)	<.001
Advised to drink less	60 (15)	40 (13)	20 (21)	.07
Discussed alcohol-related medical problem	52 (13)	27 (9)	25 (26)	<.001
Patient agreed to trial of abstinence	11 (3)	7 (2)	4 (4)	.34
Patient agreed to limit drinking	0 (0)	0 (0)	0 (0)	N.A.
Any brief intervention	156 (39)	77 (26)	79 (82)	<.001

Notes: AA = Alcoholics Anonymous; N.A. = not applicable. [a]Reminder asked providers to specifically assess those with mild/moderate unhealthy alcohol use for a history of prior treatment or AA attendance; [b]all optional assessment tools were documented at least one time except assessment of Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, criteria for alcohol-use disorders, which was never documented.

Discussion

In this study, we found that—in a setting that lacked active implementation efforts, leadership expectations that providers use clinical reminders, or incentives for clinical-reminder use or brief alcohol interventions—few providers used a clinical reminder designed to facilitate brief interventions with patients who screened positive for unhealthy alcohol use. Providers who did use the clinical reminder were mostly nurse practitioners, and advice to abstain from drinking was the care most frequently documented with the reminder. Offering providers access to the reminder was also not associated with resolution of unhealthy alcohol use among patients who initially screened positive.

Although clinical reminders embedded in electronic medical records can increase provision of indicated preventive care (Garg et al., 2005; Kawamoto, 2005; Shea et al., 1996), we did not observe substantial documentation of brief intervention with a clinical reminder at this VA site. Studies in the VA have identified several limitations of using clinical reminders to implement evidence-based care (Fung et al., 2008; Patterson et al., 2005; Saleem et al., 2005). To use a reminder in the VA, clinicians must review a list of all indicated reminders and then choose which one(s) to address. The decision to use a clinical reminder seems to depend on local clinical culture (Kerr and Fleming, 2007; Saleem et al., 2005). Further, clinical reminders are adopted more readily by clinicians when the clinical reminders are aligned with performance measures and supported by leadership (Fung et al., 2004, 2008). Although there was a national performance measure for annual alcohol screening at the time of this study, there was none for brief intervention, and reminder use by providers was not part of routine care at this VA site.

Most providers in this study did not use the alcohol-counseling clinical reminder when the opportunity arose. Studies of facilitators of reminder use have found that reminders that have a tangible benefit to providers (Militello et al., 2004) or included education (Krall and Sitting, 2002) or easy-to-navigate choices (Patterson et al., 2004, 2005) are more acceptable to providers. Our inclusion of optional assessment tools was intended to entice providers to use the reminder but failed to do so. The vast majority of providers who did use the clinical reminder were nurse practitioners, and the rate of use was highest in patients whose providers were nurse practitioners. These findings are consistent with one previous non-VA study (Hung et al., 2006) but not a previous VA study (Mayo-Smith and Agrawal, 2007). When providers did use the available clinical reminder, documented rates of use were higher in patients with severe unhealthy alcohol use than in those with mild/moderate use, and advice to abstain was most commonly documented. This is consistent with our previous research (Burman et al., 2004) and

likely reflects biases of providers toward previous approaches of case-finding and referring patients with alcohol-use disorders (Barnes et al., 1984).

Previous efficacy trials of brief interventions and/or methods of implementation have included select groups of patients and providers who consented to participate in research and were potentially more motivated to address drinking than typical patients and providers (Kaner et al., 2009). These trials also focused specifically on alcohol-related counseling and may have created unrealistic clinical situations that ignore other needs of primary care patients. For this effectiveness study, we explicitly chose not to recruit participants so as to make the study indistinguishable from routine clinical and quality assurance procedures and, therefore, evaluated a method of implementing brief interventions in a real-world clinical setting not limited by selection bias. As a result, we relied on secondary electronic clinical and administrative data and randomization of two groups of providers (randomization of individual patients was not technologically feasible, and the facility did not allow randomization of individual providers), a design that introduced important limitations. The use of secondary electronic data limited our ability to describe provider characteristics, which have previously been found to be important predictors of clinical-reminder use (Mayo-Smith and Agrawal, 2007), as well as our ability to capture alcohol counseling documented outside the clinical reminder. National patient satisfaction surveys conducted during the later part of the study period identified 28% (20%-36% across VA networks) of patients with unhealthy alcohol use reporting advice to decrease drinking (Bradley et al., 2006), suggesting that counseling likely occurred that was not documented via the clinical reminder. The low proportion of patients who had repeat alcohol screening (our outcome measure) also limited interpretability of outcome analyses and was unexpected given national rates of alcohol screening at the time (93%). However, alcohol screening was also implemented with a clinical reminder at the study site, and anecdotal information and results of this study suggest that there was little encouragement by local leaders for providers to use clinical reminders. Therefore, the low rate of follow-up alcohol screening may reflect low rates of local alcohol screening, as well as patients who did not have annual outpatient visits. Interpretability and generalizability of outcome analyses are further limited by the following: very low rates of use of the clinical reminder; the potential for "contamination" of the control group; the possibility of unmeasured confounding; potentially important unmeasured differences between patients and providers assigned to the intervention and control hallways as a result of lack of random assignment; and the fact that the study randomized only two groups, which did not provide the replication needed for proper hypothesis tests in group-randomized trials (Donner and Klar, 1994).

This single-site study found that providers seldom used an alcohol-counseling clinical reminder and that offering providers access to the reminder was not associated with any observed benefit for patients. These findings suggest that a relatively passive clinical reminder alone is insufficient to get brief interventions onto the agenda of busy primary care providers. In contrast, at another VA center where providers were expected to use clinical reminders, implementation of a similar clinical reminder was used to document brief intervention for 71% of patients with unhealthy alcohol use, and use of the clinical reminder was associated with decreased alcohol screening scores at follow-up (Williams et al., 2010). Together, findings from these studies suggest that clinical reminders might help implement brief interventions when accompanied by expectation or incentives for clinical-reminder use. As health care systems seek to integrate brief interventions into routine care, it will be important to consider other components of effective implementation, including incentives or clear expectations for providers to use decision-support systems, as well as to identify and address barriers to effective use of clinical reminders.

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