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## Access to Health Care and Heavy Drinking in Patients with Diabetes or Hypertension: Implications for Alcohol Interventions

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### Abstract

Supported by a National Institute of Alcoholism and Alcohol Abuse grant, this study examined associations between healthcare access and heavy drinking in patients with hypertension and diabetes. Using a sample of 7,428 U.S. adults from the 2007 National Health Interview Survey data, multivariate logistic regressions were performed. Better access to health care, as indicated by regular source of care and frequent use of primary care, was associated with reduced odds of heavy drinking. Alcohol interventions may be more effective if targeted at patients with chronic conditions adversely affected by drinking. Future research needs to investigate factors facilitating such interventions.

### Keywords

alcohol intervention; heavy drinking; healthcare access; primary care; hypertension; diabetes

### Introduction

Management of a chronic disease by the patient is central to controlling its effects and essential to reducing the likelihood of severe long-term complications and risks of increased morbidity and mortality (Clark, 2003; Then & Rankin, 2004). Self-management of hypertension and diabetes includes adherence to a medication regimen and a health-promoting lifestyle, including eating a healthy diet, maintaining a healthy body weight, physical activity, and moderation of intake or abstinence from alcohol (Campbell et al., 1999; Franz et al., 2002).

Reduced alcohol use is important in self-management of hypertension and diabetes for two main reasons. First, heavy drinking may independently affect clinical outcomes related to them. For the diabetic, large amounts of acute or long-term alcohol ingestion increase insulin resistance, as well as triglyceride levels, blood pressure, and all-cause mortality (Criqui and Golomb, 1999). For the hypertensive, alcohol reduction is associated with a significant reduction in systolic and diastolic blood pressures—a relationship especially stronger in those with higher baseline blood pressure (Xin et al., 2001). Secondly, alcohol use is associated with poor control of illnesses by patients with diabetes and hypertension (Ahmed, Karter, & Liu, 2006; Bryson et al., 2008). Alcohol use is predictive of poorer adherence by those with hypertension or diabetes to prescribed dietary and physical activity recommendations (Johnson, Bazargan, & Bing, 2000), as well as to medication (Bryson et al., 2008; Cox, Blount, Crowe, & Singh, 1996; Johnson et al., 2000) which is a key factor in achieving control of illnesses, improving clinical outcomes and reducing comorbidity (Krousel-Wood, Thomas, Muntner, & Morisky, 2004). The disinhibitory effects or expectations associated with alcohol might explain poor adherence to medication among regular, heavy drinkers (Ahmed et al., 2006). Even patients who misuse alcohol occasionally

may forget to take or refill prescribed medications or consciously forgo medications because they feel that they are deprived of enjoyment by adhering to their treatment regimen or they are less concerned about the effects of missing medications, or because they are concerned about how medications may interact with alcohol (Bryson et al., 2008; Cox et al., 1996).

Thus of great public health importance, alcohol use in patients with hypertension or diabetes still is an underexplored area, despite its important implications for interventions. While, as widely noted, the proven efficacy of alcohol intervention trials has not been translated into effective alcohol education administered in primary care (Roche *et al.*, 2004; Aalto and Seppa, 2007), past research indicates that alcohol intervention may be practical and effective for patients with chronic health conditions that can be adversely affected by drinking. This is because physicians are more likely to provide lifestyle counseling when they deem it appropriate or patient health behaviors are related to their conditions (Laws et al., 2009; Stead et al., 2009), and patients with chronic conditions tend to have high motivational readiness to change their lifestyle (Grandes et al., 2008) and tend to follow the advice when given (Halm & Amoako, 2008). It thus seems likely that physicians provide alcohol counseling more frequently to patients with hypertension or diabetes, who may be more likely to be receptive to it and to modify their behaviors in response. However, there is little research reported on these phenomena, especially on the latter, perhaps due to the paucity of real-life empirical data with sufficient information for evaluating the complex relationships among healthcare access, patient counseling, and drinking behaviors. This is an important gap, especially given recent research findings which suggest that resources in primary care for lifestyle interventions (including those on drinking) be spent on patients in high-risk groups with existing health conditions that might particularly benefit from them, as interventions delivered to low-risk patients are of marginal benefit (reviewed in Fleming and Godwin, 2008). As a step towards filling this gap, the present study examines whether increased access to health care is associated with reduced use of alcohol in patients diagnosed with diabetes or hypertension.

Access to health care is a multidimensional concept, including availability, organization, financing, utilization, and patient satisfaction (Aday, 1993). The focus of the present study is on three dimensions of access to health care that may significantly influence self-management of chronic conditions—*health insurance*, *regular source of care*, and *primary care use*. Past research has demonstrated that *health insurance* has substantial effects on the use of ambulatory and therapeutic care, preventive and diagnostic services, and early detection of illnesses (Hadley, 2003; Freeman *et al.*, 2008). Having a *regular source of health care* has been found to be associated with improved preventive care, continuity of care, and management of chronic illness (Bindman *et al.*, 1996; He *et al.*, 2002; Starfield and Shi, 2004;). *Primary care use* allows patients to bring a wide range of health problems for appropriate attention and provides opportunities for disease prevention and health promotion (IOM, 1996). *Frequent use of primary care* may particularly matter because it may create more opportunities for the provider to discuss patient behaviors or disseminate information or for the patient to develop a trusting relationship with the provider, who then can influence the patient's health behaviors more effectively (Ettner, 1999; Love *et al.*, 2000).

Using a nationally representative U.S. sample, the present study examines the associations among three aspects of health care access—*health insurance*, *regular place for care*, and the *frequency of primary care use*—and heavy drinking in patients with diagnosed hypertension or diabetes who are current drinkers. Given that these two conditions are among the most common chronic diseases affecting adults in the United States—an estimated 29.6% of U.S. adults had diagnosed hypertension or diabetes in 2007, according to our own analysis conducted in the course of the present study—findings from this study may have important

implications for alcohol interventions that can reach a large number of adult patients in an effective and contextually relevant manner.

## Methods

### Data

The sample used in the present study was extracted from the 2007 National Health Interview Survey (NHIS) data. The NHIS is a cross-sectional household interview survey conducted annually by the Centers for Disease Control and Prevention (CDC) to monitor the health of the United States population on a broad range of health topics. NHIS uses a multistage area probability sampling design to select samples representative of the civilian and non-institutional population living in the United States at the time of the survey. The sample used in the present study consisted of 7,428 U.S. adults aged 18 or older who had diagnosed diabetes (other than during pregnancy) or hypertension.

### Measures

The outcome of *heavy drinking* among current drinkers is a binary variable indicating whether the male respondent had more than 14 drinks a week and the female more than 7 drinks. The thresholds of 14 drinks for men and 7 drinks for women are consistent with the recommendations of the American Diabetes Association (ADA) and the National Institute of Health (NIH, 2003), though slightly lower than the level of 9 or fewer drinks per week for females with hypertension recommended by the Canadian Hypertension Education Program for the management of hypertension (Khan *et al.*, 2009).

Four health access variables were used as predictors of heavy drinking. *Health insurance coverage* indicates that the respondent had any type of coverage, public or private. *Regular source of care* indicates if respondents had one or more places that were not an emergency room where they usually went when sick. Two variables were used to capture the frequency of primary care use with no use of primary care as baseline: *infrequent use of primary care* indicating office-based medical visits of four or fewer times in the past 12 months and *frequent use of primary care* indicating more than four times.

Since patients may suffer from symptoms of diabetes or hypertension to a varying degree or have other health conditions that may affect their overall health status, which may also influence their drinking or health care utilization, *self-rated health status* was included as a covariate. Demographic variables also included as covariates were age, gender, education level (a binary variable of college or advanced degree versus less education), and family income (a binary variable of \$75,000 or more versus less).

### Data Analysis

All analyses were conducted using STATA (version 9.0) and its survey estimation procedure. Data were weighted using NHIS's *Final Sample Adult Weight* that includes all design, ratio, non-response and post-stratification adjustments. Univariate analyses were conducted to estimate the characteristics of U.S. adults with hypertension and diabetes; bivariate  $\chi^2$  tests were performed to assess the associations between the health access variables and patient demographic characteristics as well as their self-rated health status (Table 1). Three multiple logistic regression models— one for patients with hypertension, the second for those with diabetes, and the third including both—were then fitted to examine the associations between health care access and heavy drinking among current drinkers, controlling for demographic variables and self-rated health status (Table 2).

## Results

### Characteristics of U.S. Adults with Diabetes or Hypertension

Results of a series of univariate analyses (see Table 1) indicate that those diagnosed with diabetes or hypertension were older, with a mean age of 57.6 years. The vast majority with diagnosed diabetes or hypertension had access to health care: about 89% had health insurance, over 90% had a regular source of care, and about 87% had made office-based medical visits in the previous 12 months. The high proportions of persons who had access to health care—somewhat higher than reported in other studies using national samples (e.g., DeVoe *et al.*, 2003)—may be in part because only those whose conditions were diagnosed by medical practitioners (i.e. those who already had some access to health care) were included in the sample. About half (n=3596) of the respondents (52.8%) were current drinkers; of these 8.9% (n=325) were heavy drinkers, consuming more than the recommended levels of 14 drinks a week for men and 7 drinks for women.

Results of bivariate analyses (also see Table 1) suggest that, while gender was not significantly associated with health care access, other demographic variables were. Those who were older were more likely than those who were younger to have health insurance, to have regular sources of care, and to have used primary care. So were those with higher levels of education and household incomes than those with lower education and incomes. Those who rated their health status as excellent, very good, or good were slightly more likely to have health insurance than were those with fair or poor health. Among those who had used primary care, those who rated their health status as excellent, very good, or good were more likely to use primary care up to four times a year but less likely to use it more frequently than those with fair or poor health. Self-rated health status was not significantly associated with having a regular source of care.

### Results of multivariate analyses: predictors of heavy drinking

Results of multiple logistic regression analyses are presented in Table 2. Controlling for demographic variables, self-rated health status, and other health access variables, *health insurance* was not a significant predictor of heavy drinking for either those with hypertension or diabetes. *Regular place for care* was significantly associated with reduced odds of heavy drinking for those with hypertension (OR=0.47; 95% CI=0.27–0.82) but not for those with diabetes. *Frequent primary care use* was a significant protective factor from heavy drinking for both those with hypertension (OR=0.55; 95% CI=0.32–0.97) and those with diabetes (OR=0.23; 95% CI=0.06–0.92). Both regular place for care (OR=0.51; 95% CI=0.29–0.87) and frequent primary care use (OR=0.57; 95% CI=0.32–0.99) were significant predictors of reduced odds of heavy drinking for those with hypertension or diabetes (Model 3).

## Discussion

The present study found that having a *regular source of care* and *frequent use of primary care* were protective factors from heavy drinking for patients with diabetes or hypertension who were current drinkers, while health insurance was not predictive. Having a *regular place for care* was predictive of reduced odds of heavy drinking for those who had hypertension but not for those who had diabetes, while *frequent primary care use* was predictive of both. Overall, these findings suggest that increased access to health care is associated with reduced odds of heavy drinking.

These findings are somewhat consistent with those of prior research that patients with usual providers were less likely to report alcohol or other drug use (Ettner, 1999), although that study did not specifically examine alcohol use of patients with chronic conditions. They are

also in line with other research findings that hypertensive patients who had a regular source of care were more likely than those who did not to have healthier lifestyles including reduced alcohol use (He *et al.*, 2002), although the latter study did not consider the actual use of primary care. Overall, findings of the present study are consistent with those of past research indicating that having a usual source of care improves chronic illness control and health outcomes (He *et al.*, 2002; Smith *et al.*, 2005; Xu, 2002; Starfield and Shi, 2004; Damiano *et al.*, 2006).

On the surface, the findings of the present study that health insurance was not significantly associated with heavy drinking appears to run counter to the demonstrated health benefits associated with health insurance coverage (e.g., reviewed in Freeman *et al.*, 2008). However, these findings may in fact reflect the complexity of the relationships between different aspects of health access and specific health outcomes. That is to say, while one's insurance status affects entry into the health care system and the volume of care use (Mueller *et al.*, 1998), it may be the regular source of care that facilitates quality care including the provision of needed patient counseling regarding health behaviors (Starfield 2008).

As past research has suggested, a physician with an ongoing, long-term relationship with a patient might have a finer understanding of the severity of each medical problem and how multiple problems interact; also, having more frequent opportunities to discuss patient behaviors or disseminate information, such a practitioner may have a significant impact on the patient (Ettner, 1999; Love *et al.*, 2000). In turn, patients who have an ongoing physician relationship may be more trusting and willing to listen to the physician (Dietrich and Marton, 1982; Ettner, 1999) and modify their behaviors in response.

Among the documented barriers to the implementation of alcohol interventions in primary care are unrecognized alcohol problems, the perceived incompatibility of alcohol brief intervention with primary health care, and the practitioners' discomfort associated with it (Aalto and Sepa, 2001; Anderson *et al.*, 2004; McCormick *et al.*, 2006). These barriers may be more easily overcome if subgroups of patients for whom alcohol use has particularly important health implications are identified and alcohol education is framed as a legitimate component of patient counseling for them. Indeed, recent research has found that providers are more likely to provide lifestyle interventions if they consider them appropriate to address the health risks associated with patient conditions (Laws *et al.*, 2009; Ampt *et al.*, 2009). Patients with chronic conditions that can be adversely affected by drinking (such as hypertension and diabetes) fit such a profile. Given that hypertension and diabetes are among the most common conditions affecting adults in the United States and that the vast majority of patients with them visit primary care, clearly connecting these conditions with the risks of problem drinking may be an effective way to intervene with large numbers of adults at high risk of alcohol-related harms.

There are several limitations to the present study, and findings of the present study should be interpreted with caution. First, due to the lack of data in NHIS—including those on whether the patient was specifically advised by their medical practitioners to reduce alcohol use—specific mechanisms in which having a regular source of care or frequent primary care use is associated with reduced odds of heavy drinking could not be examined. One thus cannot safely assume that patients who had a regular source of care or who had used primary care frequently had reduced their alcohol use in response to medical advice. Other explanations are also possible. For example, patients who are more health-conscious may have regular sources of care, visit their care providers more often, and/or modify their drinking behaviors. Alternatively, given that patients with poor or fair self-rated health status were more likely to use primary care frequently (Table 1), it is possible that they did so and reduced alcohol use because of more grave health concerns or because physicians advise such patients more

often to reduce alcohol use. Lastly, it is possible that the findings are due in part to socially desirable response bias, with individuals who report less drinking also reporting more frequent use of primary care. Future research, ideally of a longitudinal design, should specifically examine the complex relations among health care access, the patient-provider relationships, health-risk behaviors such as drinking, and clinical outcomes to identify the specific mechanisms in which health care access can facilitate health-promoting lifestyle modifications including the reduction of alcohol use.

Despite these limitations the present study has a number of important strengths including its weighted representativeness, which enables findings to be generalizable to the segment of the U.S. population appropriate for the research question posed. The sizable sample is another strength which likely enhanced the ability to detect significant effects of health care access predictors of heavy drinking. Above all, by pointing to ways in which health care access can be used to promote alcohol education for subgroups of patients who may greatly benefit from it, findings of the present study may have important practical implications for crafting and delivering effective alcohol interventions in a contextually relevant manner. Alcohol interventions may be more effective and better integrated into routine practice if subgroups of patients with chronic conditions that can be adversely affected by drinking are targeted, which should inform future interventions in medical settings.

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**Table 1**  
 Characteristics of U.S. Adults with Diabetes or Hypertension by Health Insurance, Regular Source of Care, and Frequency of Primary Care Use

	n (%; 95% CI)		Health insurance		Regular source of care		Infrequent primary care use		Frequent primary care use	
			%	p	%	p	%	p	%	p
	<b>N=7428</b>		<b>6640 (89.2)</b>		<b>6727 (91.6)</b>		<b>3813 (53.6%)</b>		<b>2838 (38.3%)</b>	
<u>Gender</u>										
Female	3263 (52.0; 50.7–53.5)	89.4	p > .01	90.0	p < .0001	50.7	p < .0001	42.6	p < .0001	
Male	4178 (48.0; 46.7–49.3)	88.9		93.4		56.8		33.7		
<u>Age</u>										
18–29	322 (5.6; 4.9–6.4)	68.9	p < .0001	69.2	p < .0001	47.0	p < .05	36.3	p < .0001	
30–44	1045 (14.7; 13.7–15.8)	79.3		85.0		54.9		30.8		
45–64	3131 (45.4; 43.9–46.8)	87.6		92.3		55.7		36.2		
65 or older	2943 (34.4; 33.0–35.7)	98.8		97.2		51.4		44.8		
<u>Race</u>										
Hispanic	957 (9.6; 8.7–10.6)	73.3	p < .0001	82.4	p < .0001	51.7	p > .05	32.4	p < .001	
Non-Hispanic White	4579 (71.3; 69.8–72.8)	92.3		93.5		53.3		40.2		
Non-Hispanic Black	1519 (14.3; 13.2–15.4)	84.9		88.8		55.0		35.9		
Asian	304 (3.6; 3.1–4.2)	84.8		91.8		59.2		28.7		
Other	82 (1.3; 1.1–1.6)	92.3		86.4		52.6		35.4		
<u>Educational level</u>										
Did not graduate HS	1684 (19.8; 18.6–21.0)	81.2	p < .0001	87.7	p < .001	51.4	p > .05	38.1	p > .05	
HS graduate/GED	2258 (32.0; 30.7–33.4)	89.0		91.8		52.8		38.1		
Some college	1888 (26.0; 24.7–27.2)	90.5		92.0		53.1		40.3		
College degree	998 (14.4; 13.4–15.5)	93.9		93.6		57.3		36.0		
Advanced degree	533 (7.8; 7.1–8.7)	98.0		95.6		56.8		38.8		
<u>Household Income</u>										
\$0–\$34,999	3506 (42.3; 40.5–44.1)	83.2	p < .0001	87.7	p < .0001	49.5	p < .0001	41.9	p < .001	
\$35,000–\$74,999	1910 (31.7; 30.3–33.2)	89.7		92.6		52.9		38.1		
\$75,000–\$99,999	547 (10.7; 9.7–11.8)	95.1		95.6		57.5		35.2		
\$100,000 or higher	752 (15.3; 14.0–16.7)	97.2		95.8		63.2		31.9		

	n (%; 95% CI)	Health insurance		Regular source of care		Infrequent primary care use		Frequent primary care use	
		%	p	%	p	%	p	%	p
	N=7428	6640 (89.2)		6727 (91.6)		3813 (53.6%)		2838 (38.3%)	
Health status									
Excellent/very good/good	5197 (71.3; 70.0–72.6)	90.4	p < .0001	91.7	p > .05	60.0	p < .0001	31.3	p < .0001
Fair/poor	2239 (28.7; 27.4–30.0)	86.2		91.2		37.5		55.6	

Note. Ns/ns are unweighted, and the percentage of this nationally representative sample is weighted

**Table 2**

Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for Demographic Characteristics and Access to Health Care on Heavy Drinking among Patients with Hypertension and Diabetes

	Hypertension (Model 1)	Diabetes (Model 2)	Diabetes or Hypertension (Model 3)
	OR (95% CI) N=3313	OR (95% CI) N=752	OR (95% CI) N=3558
Male	1.30 (0.95–1.78)	1.07 (0.47–2.41)	1.26 (0.91–1.73)
Age <sup>a</sup>	0.99 (0.98–1.00)	1.00 (0.98–1.03)	0.99 (0.98–1.00)
Black <sup>a</sup>	0.58 (0.38–0.90) <sup>*</sup>	0.89 (0.33–2.35)	0.59 <sup>*</sup> (0.38–0.90) <sup>*</sup>
Hispanic <sup>a</sup>	0.54 (0.31–0.93) <sup>*</sup>	1.14 (0.36–3.62)	0.54 <sup>*</sup> (0.31–0.91) <sup>*</sup>
Asian <sup>a</sup>	0.16 (0.05–0.50) <sup>**</sup>	0.68 (0.12–3.72)	0.26 <sup>**</sup> (0.11–0.66) <sup>**</sup>
College or higher degree <sup>b</sup>	0.92 (0.66–1.27)	1.32 (0.64–2.70)	0.92 (0.67–1.25)
Family income (\$75K+) <sup>c</sup>	0.83 (0.58–1.19)	0.22 (0.72–0.69) <sup>**</sup>	0.85 (0.59–1.21)
Excellent/very good/good health <sup>d</sup>	0.89 (0.63–1.27)	0.90 (0.45–1.81)	0.97 (0.67–1.40)
Health insurance <sup>e</sup>	1.33 (0.73–2.42)	0.55 (0.15–1.99)	1.20 (0.69–2.10)
Regular place for care <sup>f</sup>	0.47 (0.27–0.82) <sup>**</sup>	3.86 (0.85–17.52)	0.51 <sup>*</sup> (0.29–0.87) <sup>*</sup>
Infrequent primary care use <sup>g</sup>	0.86 (0.53–1.41)	0.29 (0.08–1.02)	0.85 (0.54–1.35)
Frequent primary care use <sup>h</sup>	0.55 (0.32–0.97) <sup>*</sup>	0.23 (0.06–0.92) <sup>*</sup>	0.57 <sup>*</sup> (0.32–0.99) <sup>*</sup>

\* p <.05;

\*\* p <.01;

\*\*\* p <.001

<sup>a</sup>Whites as baseline

<sup>b</sup>Those with less than college degree as baseline

<sup>c</sup>Those with annual family incomes of less than \$75,000 as baseline

<sup>d</sup>Those with fair or poor health as baseline

<sup>e</sup>Those with no health insurance coverage as baseline

<sup>f</sup>Those with no regular places of care as baseline

<sup>g</sup>Those with no primary care use and frequent primary care use as baseline

<sup>h</sup>Those with no primary care use and infrequent primary care use as baseline