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Associations Among Healthcare Utilization and Binge Drinking

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1 TITLE

2 Associations Among Healthcare Utilization and Binge Drinking

3

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5

6 ABSTRACT

7 *Objective.* To examine associations among routine healthcare services and binge drinking in
8 Vermont adults.

9 *Methods.* We analyzed a cross-sectional sample of randomly selected 6516 adults who
10 participated in the self-reported 2017 Vermont Behavioral Risk Surveillance System survey. We
11 estimated odds ratios for responses indicative of binge drinking in association with length of time
12 since last routine checkup using a bivariate logistic regression model.

13 *Results.* Participants who reported binge drinking were 31% (OR = 0.69, 95% confidence
14 interval [CI] = 0.56, 0.83) less likely to engage in a healthcare visit within the past year
15 controlling for age, employment status, annual household income, and sex with all tests holding
16 statistical significance ($P \leq 0.05$).

17 *Conclusion.* Findings indicated that binge drinking coincided with a decrease in likelihood of
18 using routine healthcare services within one year.

19 *Policy recommendations.* Binge drinking remains a costly form of substance misuse,
20 physically to the individual and financially to the public. Addressing perceived barriers and
21 encouraging those who binge drink to seek annual routine healthcare services is vital to ensuring
22 these at-risk populations receive care.

23

24 INTRODUCTION

25 Vermont adults report alcohol consumption and binge drinking at rates higher than national
26 averages.¹ Data shows that between 2012-2016 there was a 33% increase in alcohol attributable
27 deaths in Vermont due to acute causes such as falls, motor-vehicle accidents, and drownings.¹
28 This was in addition to a 15% increase in alcohol attributable deaths due to chronic conditions,
29 including cirrhosis of the liver and cancer.¹

30 The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines binge drinking as
31 a pattern of drinking that brings blood alcohol concentration (BAC) to 0.08g/dL, typically

32 equating to four or more drinks for women and five or more drinks for men over a two-hour
33 period.²

34 One approach for addressing substance misuse is through identification and intervention
35 during routine healthcare services. Therefore, access and use of routine healthcare is a necessary
36 condition for that method. Vermont boasts a high percentage of its residents having access to
37 healthcare services, with at least 95% of Vermonters being insured as of 2016.³

38 There is limited research examining the relationship between binge drinking and routine
39 utilization of healthcare. However, existing research reveals potential benefits with integration of
40 substance use interventions and primary care.^{4,5} The Screening, Brief Intervention, Referral to
41 Treatment (SBIRT) model represents an encouraging example reporting a 34.3% ($P < 0.01$) drop
42 in an individual's Alcohol Use Disorder Identification Test (AUDIT) from initial contact to a 6-
43 month follow-up evaluation ($n=9,437$).⁶ Integration of substance use screening and intervention
44 models could lead to mitigation of alcohol related adverse health conditions.

45 Our research aims to explore the relationship between binge drinking and the utilization of
46 routine healthcare services. We used data from the 2017 Vermont Behavioral Risk Surveillance
47 System (BRFSS) survey report to examine this relationship controlling for age, employment
48 status, annual household income, and sex.⁷

49

50 METHODS

51 A cross-sectional study was conducted between September 2018 and February 2019 utilizing
52 data from the 2017 Vermont BRFSS, a Center for Disease Control and Prevention (CDC) funded
53 telephone survey. Participants were chosen randomly and anonymously interviewed. The 6,516
54 respondents, all 18 years or older, were asked a uniform set of questions with the results
55 weighted to represent the Vermont adult population. The primary predictive variable was
56 *Calculated Binge Drinking Status* ($n=6068$). The outcome variable selected was *Length of Time*
57 *Since Last Routine Check-Up* ($n=6,443$), recorded as a binary variable that consisted of a
58 response of 0=no routine checkup within the last year and 1=yes routine checkup within the last
59 year. Remaining variable coding found in Table 1. Other demographic and socioeconomic
60 variables were treated as nominal and included: age, employment status, annual household
61 income, and sex. We used bivariate logistic regression analysis to determine predictors of *Length*
62 *of Time Since Last Routine Check-up*. Analyses were performed using SPSS Version 24 and all

63 tests were evaluated for a significance level < 0.05 . The University of Vermont Institutional
64 Review Board has reviewed this project and determined that it qualifies as exempt from
65 additional review.

66

67 RESULTS

68 Individuals who did not provide responses to the calculated binge drinking questions were
69 excluded ($n=448$), leaving a study sample of 6,068 participants. Of that remaining sample, 13.4%
70 of individuals ($n=811$) reported values that met or exceeded levels qualifying for binge drinking
71 status. Characteristics of the 6,068 cases included in the analyses are shown in Table 1. Our
72 analysis shows the following rates of reported binge drinking among each demographic group:
73 32.4% among individuals 18-24 years old; 25.3% among individuals 25-44 years old; 13.1%
74 among individuals 45-64 years old; 4.8% among individuals ≥ 65 years old; 8.1% of unemployed
75 individuals; 17.7% of employed individuals; 12.6% of individuals earning $< \$50,000/\text{year}$;
76 15.4% of individuals earning $\geq \$50,000$; 10% of females; 17.5% of males.

77 The following independent demographic groups were most likely to have been seen for a
78 routine health care visit within the past year; ages ≥ 65 , unemployed, earning under
79 $\$50,000/\text{year}$, and females (Table 1).

80 Bivariate logistic regression revealed that individuals who engaged in binge drinking were
81 31% less likely ($OR=0.69$, $[CI\ 0.56, 0.83]$) to make a routine health care visit within the past
82 year compared to individuals who did not controlling for age, employment status, annual household
83 income, and sex.

84 A Cox & Snell R-square test was performed resulting in a value of 0.069; a low explanatory
85 power for the combination of predictors included in the analysis. The Hosmer and Lemeshow
86 Test chi-square value of 5.168 ($DF=8$, $Sig= 0.740$) indicated adequate goodness of fit.

87

88 DISCUSSION

89 Our findings indicate statistical significance in the decreased odds of binge drinkers attending
90 an annual healthcare visit. Among those who engaged in routine healthcare services, only 11%
91 reported binge drinking whereas that percentage nearly doubled (21%) among the sample of
92 those who did not. Binge drinking rates were highest among the following demographic
93 subgroups: 18-24 years-old, employed, annual household income of $\geq \$50,000$, and males. The

94 results suggest that the lowest reported rates of binge drinking correlate to the highest attendance
95 in annual routine healthcare visits.

96 There are several limitations within our study. The BRFSS's exclusive use of landline
97 telephone surveys poses the risk of omitting individuals who strictly use cellular devices and
98 those who do not have access/use phones. Data was collected via self-reporting where
99 participants can modify their answers, therefore, recall bias may exist. Race was not included as
100 a predictor due to the limited sample size (5.5% identifying as person of color), while other
101 demographic variables were also not considered as they were beyond the scope of our model.

102

103 PUBLIC HEALTH IMPLICATIONS

104 Binge drinking has long been identified as a serious and preventable public health concern
105 per CDC standards.⁸ Contrary to other classifications of high-risk alcohol consumption, such as
106 heavy drinking, binge drinking presents a number of acute public health risks including alcohol
107 poisoning, car crashes, falls, high-risk sexual practices, lapses in short and long-term memory, as
108 well as longer term chronic conditions like diabetes and cancer.⁸ Notable is the conclusion
109 derived from Sacks et al's 2015 report placing the 2010 Vermont total cost of excessive alcohol
110 consumption at \$513 million, of which \$377 million were attributed to binge drinking.⁹

111 Advocacy of routine healthcare for those engaging in binge drinking is critical in facilitating
112 proper intervention and referrals for treatment. Data collected by UVM Central Vermont
113 Medical Center shows strong promise for the SBIRT model: 82% of participants with alcohol-
114 related risks reported changes in their alcohol consumption six months after having a brief
115 intervention.¹⁰ Further research is needed to identify alternative sites to reach subgroups who
116 demonstrate the highest binge drinking rates.

117

TABLE 1- Binge Drinking and Demographic Factors in Relation to Routine Healthcare Visits, 2017

% of Calculated Binge Drinking Study Population	% of Subgroup Engagement in Routine Healthcare Visit in past year	OR (95% CI)
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Binge Drinking Status			0.69 (0.56, 0.83)
No Binge Drinking	86.6	76.3	
Yes Binge Drinking	13.4	60.0	
% Missing	0.0	1.1	
Age			1.6 (1.5, 1.7)
18-24	4.5	66.8	
25-44	19.4	56.4	
45-64	39.6	72.2	
≥ 65	35.3	86.9	
% Missing	1.2	2.2	
Employment Status			0.55 (0.47, 0.64)
Unemployed	44.4	82.7	
Employed	55.1	67.3	
% Missing	0.5	1.5	
Annual household income			1.3 (1.1, 1.5)
< \$50,000	41.7	73.8	
≥ \$50,000	40.9	73.5	
% Missing	17.4	18.1	
Sex			0.73 (0.64, 0.84)
Female	55.1	76.9	
Male	44.7	70.6	
% Missing	0.1	1.2	

118 *Note.* CI = confidence interval; OR = odds ratio. The sample size was n = 6068.

119

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149 AUTHORSHIP STATEMENTS

150 The following authors have participated substantially to the workload and content of this
151 project and are willing to provide relevant data upon request. In addition, all authors have
152 contributed to the concept and design as well as the drafting, revision, and approval of the final
153 version of this project.

154 Ethan Grey, Project Manager, led overall conceptualization and design of the study.
155 Contributed to drafting and revising the manuscript. Wrote the abstract and assisted with
156 interpretation of the results.

157 Charles Phalon, Lead Writer, contributed to the concept of the study. Led the construction
158 and revision of the introduction and discussion portions of the manuscript.

159 Anna Greene contributed to the defining and conceptualization of the study. Co-wrote and
160 revised the drafts and finalized copy of the project and manuscript.

161 Patricia Harmeyer, Lead Analyst, co-conceived and co-designed the research study,
162 developed the analytical model, lead the statistical analysis with co-identification and re-
163 categorization of study variables, wrote the methods section and assisted in drafting the
164 manuscript.

165 Kalyn Rosenberg, Analyst/Data Manager, co-conceived the research question and co-
166 designed the study. Supported lead analyst in organizing and managing the data set, creating the
167 analytic plan, and conducting descriptive analysis. Assisted with interpretation of the results and
168 the writing of the article.

169 Cristine Griffing, Literature Manager, responsible for obtaining relevant resources and
170 communicating findings; responsible for the final brief article complying with appropriate
171 citation standards.

172 Thomas Delaney, Ph.D. provided supervision in study design, interpretation of the results,
173 and final approval of the manuscript.