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Alcohol Screening Scores and the Risk of Intensive Care Unit Admission and Hospital Readmission

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Abstract

Background—The association between alcohol misuse and the need for intensive care unit admission as well as hospital readmission among those discharged from the hospital following a critical illness is unclear. We sought to determine whether alcohol misuse was associated with 1) admission to an intensive care unit (ICU) among a cohort of patients receiving outpatient care and 2) hospital readmission among those discharged from the hospital following critical illness.

Methods—This was a retrospective cohort study conducted with data from 24 Veterans Affairs (VA) healthcare facilities between 2004 and 2007. Scores on the Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) questionnaire were used to identify patients with past-year abstinence, lower-risk alcohol use, moderate alcohol misuse, or severe alcohol misuse. The primary outcome was admission to a VA intensive care unit within the year following administration of the AUDIT-C. In an analysis focused on patients discharged from the ICU, the two main outcomes were hospital readmission within 1 year and within 30 days.

Results—Among 486,115 Veterans receiving outpatient care, the adjusted probability of ICU admission within one year was 2.0% (95% CI, 1.7%–2.3%) for abstinent patients, 1.6% (1.3%–

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The authors declare that they have no conflicts of interest.

AUTHOR CONTRIBUTIONS

Dr. Clark takes responsibility for the content of this manuscript. Drs. Bradley and Rubinsky had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Drs. Bradley, Clark, and Moss were responsible for the study concept and design. Drs. Clark, Rubinsky, Moss, Au, Ho, Chavez, and Bradley participated in the acquisition, analysis, and/or interpretation of the data. Drs. Clark and Rubinsky drafted the manuscript. All authors provided critical revision of the manuscript for important intellectual content.

1.8%) for patients with lower-risk alcohol use, 1.8% (1.4%–2.3%) for patients with moderate alcohol misuse, and 2.5% (2.0%–2.9%) for patients with severe alcohol misuse. Among the 9,030 patients discharged from an ICU, the adjusted probability of hospital readmission within one year was 48% (46%–49%) in abstinent patients, 44% (42%–45%) in patients with lower-risk alcohol use, 42% (39%–45%) in patients with moderate alcohol misuse, and 55% (49%–60%) in patients with severe alcohol misuse.

Conclusions—Alcohol misuse may represent a modifiable risk factor for a cycle of ICU admission and subsequent hospital readmission.

Keywords

alcohol-related disorders; intensive care units; patient readmission; alcohol consumption; health care utilization; alcohol abuse

INTRODUCTION

Alcohol misuse refers to a spectrum of drinking, ranging from consumption in excess of recommended limits without consequences to a maladaptive pattern of excessive alcohol consumption termed an alcohol use disorder (AUD).^{1,2} With 88,000 alcohol attributable deaths per year in the United States, alcohol misuse is the third leading cause of preventable mortality and accounts for \$25 billion in annual healthcare expenditures.^{3–6} As effective population-based approaches to management of alcohol misuse continue to evolve,^{7–9} understanding the relationship between alcohol misuse and potentially preventable and costly measures of healthcare utilization will aid in assessing the benefits of improved alcohol-related services.

ICU admission and hospital readmission are two costly events for the U.S. healthcare system. Between 2000 and 2005, ICU-related costs rose 60% from \$57 billion to \$81.7 billion, representing almost 1% of the U.S. gross domestic product.¹⁰ With the full institution of the federal Hospital Readmissions Reduction Program for fiscal year 2013, some U.S. hospitals may be financially penalized for excessive rates of hospital readmission.¹¹ Understanding modifiable risk factors for ICU admission and hospital readmission may provide some insight for hospital systems to deliver more cost-effective care. Although alcohol misuse is associated with higher rates of hospitalization,^{12–14} there is little research regarding the association between alcohol misuse and ICU admission or hospital readmission as measures of healthcare utilization.¹⁵

The Veteran's Health Administration (VHA) supports the country's largest integrated healthcare system and began screening for alcohol misuse in 2004 using the 3 item Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) screening questionnaire.¹⁶ As an integrated healthcare system with high rates of alcohol screening, VHA offers a unique opportunity to examine the association between patterns of alcohol consumption and healthcare utilization. This study had two aims: to evaluate the association between alcohol screening and ICU admission in the following year, and among patients discharged from the hospital following an ICU stay, the association between alcohol screening in the year prior to ICU admission and a subsequent hospital readmission. Based on the association between

alcohol misuse and numerous illnesses that are commonly cared for in an ICU,^{17–23} we hypothesized that outpatients with alcohol misuse would have higher rates of ICU admission. We further hypothesized that alcohol misuse would be associated with hospital readmission at one year and at 30 days following hospital discharge in patients who required an ICU admission. Finally, we sought to describe the reasons for ICU admission and hospital readmission in patients with alcohol misuse.

METHODS

Study design and population

This study was a secondary analysis of a retrospective cohort study designed to validate changes in alcohol screening scores over time within the VA healthcare system. Veterans age 18 and older were potentially eligible for the primary study if they received outpatient care at one of 24 VA facilities (in the Northern and Western U.S.) between January 1, 2004 and December 31, 2007. This four year period represents the time between implementation of alcohol screening and more widespread implementation of brief alcohol counseling within the VA system and thus may be more reflective of care in other U.S. healthcare systems.^{16,24} Because the primary study was designed to validate changes in alcohol screening scores, patients were included in the primary study if they had alcohol screening performed on two occasions at least twelve months apart during the study period. Patients were excluded if they received no VA care or died in the year after their second alcohol screen. Data were obtained from the VA Corporate Data Warehouse, VA National Patient Care Database, VA Vital Status Master file, and VA-Medicare Database. The study had waivers of informed consent and Health Insurance Portability and Accountability Act (HIPAA) authorization and was approved by the VA Puget Sound Institutional Review Board (IRB).

Independent variable – Alcohol Screening Categories

All veterans who receive care within the VA system are expected to be offered annual alcohol screening with the 3 question AUDIT-C. AUDIT-C scores were obtained from electronic medical record data, in which providers document alcohol screening that is prompted during clinic visits with a clinical reminder.¹⁶ The AUDIT-C is a validated screen for alcohol misuse that asks about past year drinking. It contains one question assessing drinking frequency, one question assessing the number of drinks per typical drinking occasion, and one question assessing frequency of drinking 6 or more drinks on one occasion.^{25–27} The three items have scores 0–4 which are summed with total scores ranging from 0 to 12 points. A score of 0 denotes abstinence in the past year. Scores of 1–4 denote lower-risk alcohol use, 5–7 moderate alcohol misuse, and 8–12 severe alcohol misuse. These categories were designated *a priori* based on prior work.^{28–32} Only the patient's first AUDIT-C score from the CDW during the study period was used for this analysis. The AUDIT-C does not distinguish former drinkers from lifetime abstainers; these groups differ markedly in the number and severity of their medical comorbidities.^{17,33} Therefore, consistent with prior studies, we used lower-risk alcohol use as the reference group for all analyses.^{28–32}

Outcome variables

Consistent with the two aims of this study, there were two primary outcome measures. For the first aim evaluating the association between alcohol screening groups and admission to a VA ICU, the primary outcome was any ICU stay ≥ 1 day in the year (1–365 days) following the first alcohol screen. Admission to an ICU was defined as admission to a VA hospital with a bed section code of 12 (medical ICU) or 63 (surgical ICU). Although there is a bed section code for cardiac ICU (13), none of the hospitals included in this sample had dedicated cardiac ICUs. For the second aim, the primary outcome was readmission to a VA hospital within one year (1–365 days) of ICU discharge.

Hospital readmission was defined as any admission to an inpatient VA medical facility. During the study design, hospitalization within one year was chosen as the primary outcome variable for this aim in order to maximize power. However, because many hospital readmissions within 30 days are thought to be preventable, hospital readmissions within 30 days were considered as a secondary outcome variable for this aim.

In order to gain a greater understanding of the reasons for healthcare utilization, we used ICD-9 CM codes for the principal discharge diagnosis of the initial ICU admission and for hospital readmission. Clinical classification software, available through the Agency for Healthcare Research and Quality's Healthcare Utilization Project (<http://www.hcup-us.ahrq.gov/toolsoftware/ccs/ccs.jsp>), was used to group discharge diagnoses by organ systems.

Covariates

Variables known to be associated with both alcohol misuse and hospital readmission were included as covariates in the multivariable analyses. These included age (< 50 years, 50–64 years, 65–79 years, and 80 years or older), race/ethnicity (White, African American, Hispanic, or other), marital status (single or never married, divorced or separated, married, widowed, unknown or missing), VA coverage eligibility (full VA coverage, service-connected <50%, non service-connected), Charlson/Deyo comorbidity index (0–2, 3 or greater)³⁴, and smoking status (current smoker or current non-smoker). Patients were considered to be a current smoker if they had a tobacco diagnosis (ICD-9 305.1, 989.4, v15.82) or a health factor indicating current smoking.³⁵ Data for all covariates were from the year preceding AUDIT-C screening.

Statistical Analysis

Pearson's chi-square was used to compare differences in patient characteristics across alcohol screening categories. For Aim 1, to determine whether alcohol screening categories were associated with ICU admission in the following year, we constructed a multivariable logistic regression model with alcohol screening category as the predictor and admission to a VA ICU as the outcome variable. The model adjusted for the above specified covariates and estimated cluster robust standard errors to account for correlated data within VA facilities. Post-estimation predictions were then used to determine average adjusted probabilities and confidence intervals and to determine the absolute difference in adjusted probability between alcohol screening categories. This approach, known as regression risk analysis, provides a

more intuitive interpretation of study results than odds ratios, allows comparison of risk across groups while holding covariates constant, and is widely recommended when using nonlinear models.³⁶

For Aim 2, to determine whether alcohol screening categories were associated with hospital readmission in the cohort of patients discharged from the hospital following an ICU stay, we constructed two separate multivariable logistic regression models with alcohol screening category as the predictor. For the primary analysis, hospital readmission within one year of ICU discharge was the outcome variable. For the secondary analysis, hospital readmission within 30 days was the outcome variable. Both of these models were adjusted for the same pre-specified covariates; estimated cluster robust standard errors allowed for correlated data within VA facilities. Adjusted probabilities and absolute differences in adjusted probabilities between alcohol screening categories were calculated as in Aim 1.³⁶

In order to examine the robustness of our findings, two sensitivity analyses were conducted. First, to further examine the lower end of the AUDIT-C cutoff for alcohol misuse, we added a fifth alcohol screening category that contained female patients with an AUDIT-C of 3 or 4 and male patients with an AUDIT-C of 4. For this analysis, female patients with an AUDIT-C score of 1 or 2 and male patients with an AUDIT-C score of 1–3 were used as the reference group. In the second sensitivity analysis, we excluded women given the small numbers of women with severe alcohol misuse in this sample. Both sensitivity analyses were conducted using the same outcome variables as Aims 1 and 2.

RESULTS

During the study period 556,686 patients were potentially eligible; 486,115 patients were included in this study (Figure 1). The most common reason for exclusion was receiving no VA care during the 1 year follow-up period. Of patients who met inclusion criteria, 20,879 (3.7%) died during the follow-up period. Based on alcohol screening, 51% of patients reported abstinence from alcohol in the year prior to screening, 40% reported lower risk alcohol use; 6% and 3% of patients reported moderate, and severe alcohol misuse, respectively. Patients with moderate and severe alcohol misuse were younger and more likely to be male, current smokers, and have fewer medical comorbidities (Table 1). Compared to patients with lower risk alcohol use, those who reported past year abstinence had more medical comorbidities, were older, and were more likely to have full VA coverage.

Among the 486,115 patients included in this study, 9,030 (1.9%) were admitted to an ICU in the year following alcohol screening. Compared to patients with lower risk alcohol use, those with abstinence, moderate, and severe alcohol misuse had a higher unadjusted probability of ICU admission (Table 2). After adjustment for pre-specified covariates, the relationship between alcohol screening category and ICU admission was unchanged with a higher probability of ICU admission in patients with abstinence, as well as moderate and severe alcohol misuse when compared to those with lower-risk alcohol use (Table 2). In a fully-adjusted logistic regression model, compared to patients with lower risk alcohol use, the absolute difference in the adjusted probability of ICU admission was 0.5% (0.3%–0.6%) for abstinent patients, 0.3% (95% CI, 0.03%–0.5%) for patients with moderate alcohol

misuse, and 0.9% (95% CI 0.5%–1.2%) for patients with severe alcohol misuse. In patients with severe alcohol misuse, the most common reasons for ICU admission were diseases of the circulatory system (35%), diseases of the digestive system (12%), mental illness (10%), and neoplasm (10%). This pattern of discharge diagnoses was similar to those seen in patients with lower risk alcohol use with the exception of admissions for mental illness which accounted for 1–2% of discharge diagnoses in the other alcohol screening categories (see supplement, eTable 1).

In the year following hospital discharge, 4,171 (46%) of the 9,030 patients who were admitted to the ICU were readmitted to a VA hospital. The unadjusted probability of hospital readmission was higher in patients with severe alcohol misuse (56%; 95% CI, 51%–61%) and abstinence (48%; 95% CI, 47%–49%) when compared to those with lower-risk alcohol use (44%; 95% CI 41%–45%) while the probability of hospital readmission in patients with moderate alcohol misuse was similar (42%; 95% CI 38%–46%). After adjustment, the u-shaped association between alcohol consumption and hospital readmission persisted (Table 3). In a fully-adjusted logistic regression model, compared to patients with lower risk alcohol use, the absolute difference in the adjusted probability of hospital readmission within 1 year was 4% (95% CI 2%–6%) for abstinent patients and 11% (95% CI, 6%–17%) for patients with severe alcohol misuse. Patients with moderate alcohol misuse had a 2% (95% CI, 1%–5%) lower adjusted probability of ICU admission. For hospital readmissions, mental illness (26%) replaced diseases of the circulatory system (24%) as the most common discharge diagnosis in patients with severe alcohol misuse (supplement eTable 2).

In the pre-specified secondary analysis examining the association between alcohol screening category and hospital readmission within 30 days, 1,594 (18%) of the 9,030 patients were readmitted to a VA hospital. In an unadjusted analysis, there was a similar u-shaped association: 18% (95% CI, 17%–19%) of those with abstinence, 16% (95% CI, 15%–17%) of those with lower-risk alcohol use, 15% (95% CI 12%–19%) of those with moderate alcohol misuse, and 24% (95% CI 19%–28%) of those with severe alcohol misuse were readmitted within 30 days of hospital discharge. In a fully adjusted logistic regression model, this relationship was unchanged; the absolute difference in the adjusted probability of hospital readmission was 7% (95% CI, 3%–11%) for patients with severe alcohol misuse when compared to patients with lower-risk alcohol use (Table 3).

In a sensitivity analysis, women with AUDIT-C scores of 3–4 and men with AUDIT-C scores of 4 were considered as a separate alcohol screening category. In a fully-adjusted logistic regression model, compared to patients with lower risk alcohol use, patients with these scores had a 0.3% (95% CI 0.2%, 0.4%) lower adjusted probability of ICU admission while patients with moderate alcohol misuse no longer had a higher adjusted probability of ICU admission (absolute difference 0.2%; 95% CI –0.03%, 0.44%; $p = 0.10$). Other findings were essentially unchanged (eTables 3 and 4). In a sensitivity analysis excluding women (data not shown), the findings were also essentially unchanged though the higher adjusted probability of ICU admission among outpatients with moderate alcohol misuse no longer reached statistical significance (absolute difference in adjusted probability 0.2%; 95% CI 0%, 0.4%; $p = 0.051$).

DISCUSSION

This study assessed the association between alcohol screening categories and ICU admission as well as hospital readmission in patients discharged from the hospital following an ICU stay. As hypothesized, in VA patients screened for alcohol misuse with the AUDIT-C during outpatient care, the adjusted probability of ICU admission was 0.9% higher in patients with severe alcohol misuse when compared to those with lower risk use. In the year following ICU admission, there was an even more marked 11% absolute difference in the adjusted probability of hospital readmission within one year. While these absolute differences appear modest, this conservatively translates to an additional 3,000 intensive care unit admissions each year among veterans receiving care in the VA at an estimated cost of \$31,500 per ICU admission.³⁷ These findings are consistent with the observation that alcohol misuse is associated with an increased risk of several of the illnesses that commonly account for ICU admission and hospital readmission.^{17–22}

An unexpected finding was that moderate alcohol misuse was associated with a higher probability of ICU admission but the same risk of hospital readmission compared to lower-risk alcohol use. However, the increased probability of ICU admission among patients with moderate alcohol misuse did not hold in sensitivity analyses varying the lower end of the AUDIT-C cutoff for alcohol misuse and when women were excluded. While the finding in the main analysis may be due to type I error, it is also possible that patients with moderate alcohol misuse may decrease or stop drinking following hospital discharge, thus removing the risk that precipitated their illness.

The association between alcohol misuse and ICU admission is important because alcohol misuse is a potentially modifiable risk factor. There are evidence-based approaches to addressing alcohol misuse in the outpatient setting. Screening and brief intervention involves systematic screening to identify alcohol misuse followed by brief 10–15 minute discussions that provide a framework for healthcare providers to address alcohol misuse with their patients.^{38–42} Screening and brief intervention received a “B” grade from the United States Preventive Services Task Force.⁹ However, a major limitation of brief interventions is that even in primary care where they are proven effective, most patients do not respond to a single brief intervention and patients with severe alcohol misuse may be least likely to respond.⁴³ Furthermore, it is unclear whether brief interventions decrease rates of healthcare utilization.⁸ Referral to treatment is often recommended when patients do not respond to brief intervention, but even in acute care settings most patients with severe alcohol misuse do not accept referral to treatment.⁴⁴ Therefore, new models of managing severe alcohol misuse, including alcohol use disorders, are needed.^{7,45,46}

Because studies of brief intervention exclude patients who are critically ill, there is currently no evidence-based approach to post-discharge care in ICU survivors with alcohol misuse. Despite longstanding recognition of the high prevalence of alcohol misuse in patients admitted to an ICU,⁴⁷ no studies have tested interventions to improve outcomes in this high risk population. Therefore, current guidelines for the delivery of multidisciplinary care in the ICU setting are silent on addressing alcohol misuse in ICU survivors.⁴⁸ Screening and brief intervention is unlikely to be effective in ICU survivors for several reasons. First, most ICU

survivors with alcohol misuse have an alcohol use disorder.^{49,50} As such, a single brief intervention, which is primarily designed to address non-dependent at-risk drinking, is unlikely to be effective.^{44,51} Second, ICU survivors have high rates of cognitive dysfunction.⁵² Therefore, asking ICU survivors to weigh pros and cons of their drinking at a time when there may be significant executive dysfunction may not be optimal. Finally, ICU survivors with alcohol misuse have high rates of co-morbid psychiatric illnesses such as depression, anxiety or serious mental illness; the presence of one of these psychiatric comorbidities in addition to alcohol misuse is associated with higher rates of hospital readmission in ICU survivors.⁵³ Current systems of care do little to identify and address these concomitant mental health issues. This was highlighted in the current study where mental illness was the most common reason for hospital readmission among ICU survivors with severe alcohol misuse. Our findings, in conjunction with the previously described unique features of ICU survivors with alcohol misuse suggest the need to develop targeted post-discharge care for this population.⁵⁴

This study has several potential limitations. First, although the association between alcohol misuse and ICU admission and hospital readmission persists after risk adjustment, there is still the potential for residual confounding. For example, our measure of smoking did not quantify lifetime exposure or separate former from never smokers. Furthermore, there may be residual confounding by socioeconomic status. Second, abstinence was also associated with higher rates of healthcare utilization. This is a consistent finding in studies examining the association between alcohol consumption and health outcomes. Although there may be a “protective effect” of alcohol when consumed in moderation,⁵⁵ residual or unmeasured confounding from medical comorbidities is a more likely explanation.^{56,57}

Third, this study did not account for ICU admission or hospital readmission outside of the VA system. If patients with lower-risk alcohol use were preferentially admitted to hospitals outside of the VA system, this could lead to differential misclassification and bias the results of this study. While hospitalizations outside of the VA system undoubtedly occurred, there is no reason to suspect that they would have preferentially occurred in patients with lower-risk alcohol use.

It is, however, likely that the rates of ICU admission and hospital readmission reported in this study are underestimated. Although the degree of underreporting cannot be determined, the rates of ICU admission in this study are similar to those in the general population in the U.S.⁵⁸ However, rates of hospital readmission overall in this study (46%) were lower than those reported in a large study of Medicare beneficiaries (56%).⁵⁹ Furthermore, the data in this study did not allow planned hospital readmission (for example, a staged cardiac procedure) to be distinguished from unplanned hospital readmission. Death may also be a competing risk for hospital readmission. Patients who died during the study follow-up period were excluded from the parent study and, therefore, not included in this analysis. Because mortality is higher in ICU survivors with alcohol misuse, it is possible that excluding patients who died led to an underestimation of the effect sizes in this study.⁶⁰

Finally, this study used clinical alcohol screening data as opposed to data obtained from mailed surveys. Since clinical alcohol screening data is obtained face to face, it may be more

subject to social desirability bias. Furthermore, problems with the quality of clinical alcohol screening data have been described including the lack of administration of the AUDIT-C in a standardized fashion.^{61–63} However, we suspect that misclassification resulting from underreporting of AUDIT-C scores would lead to an underestimation of risk for patients with alcohol misuse in the current study.

Conclusion

Alcohol misuse represents a potentially modifiable risk factor for ICU admission and, among ICU survivors, hospital readmission within one year and within 30 days. Novel strategies to reduce healthcare utilization in patients with severe alcohol misuse are needed. To address alcohol misuse in this high risk cohort, studies that develop and test an approach that accounts for unique characteristics of ICU survivors with alcohol misuse, are also needed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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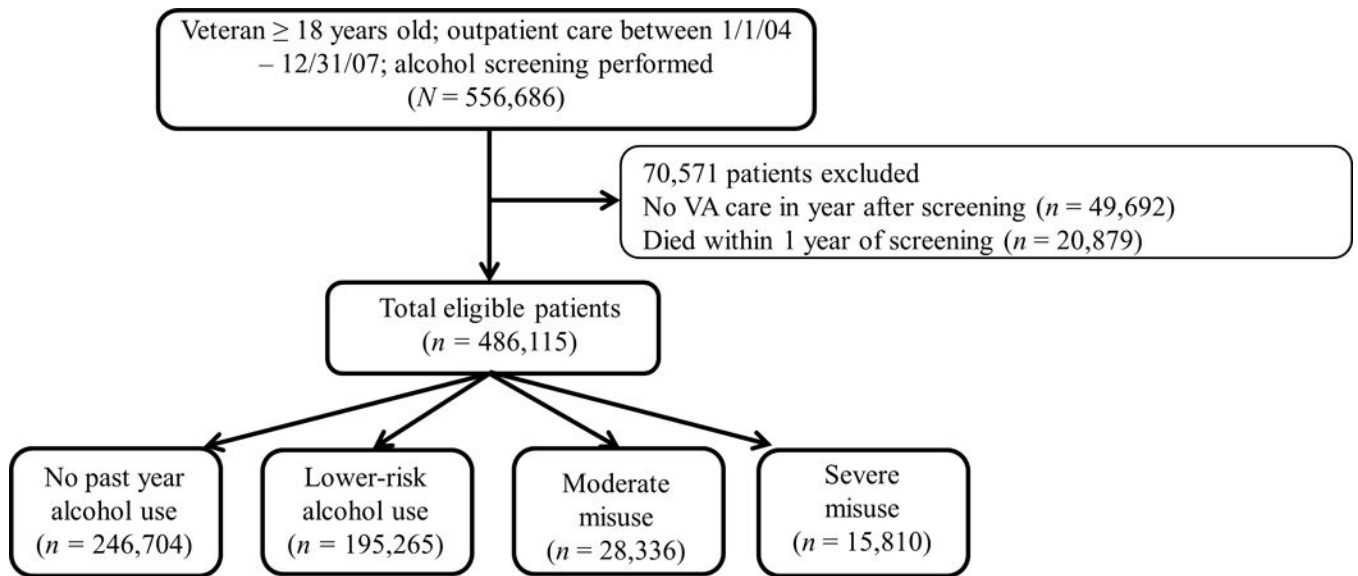


Figure 1.
Patients included in the study sample.

TABLE 1

Baseline Characteristics of Patients by Results of Alcohol Screening

	No Past Year Alcohol Use (n = 246,704)	Lower-Risk Alcohol Use (n = 195,265)	Moderate Alcohol Misuse (n = 28,336)	Severe Alcohol Misuse (n = 15,810)
Age * (%)				
< 50	7	11	14	15
50–64	33	33	42	55
65–79	35	35	35	26
80+	25	21	9	4
Gender * (% male)	94	94	98	98
Race/Ethnicity * (%)				
White	67	65	57	52
African American	8	6	6	8
Hispanic	5	4	5	6
Unknown	14	22	29	30
Other	5	3	3	4
Marital Status * (%)				
Single	14	13	18	23
Divorced/Separated	24	24	32	40
Married	56	56	44	33
Widowed	6	5	4	3
Unknown	<1	<1	<1	1
VA eligibility * (%)				
Full VA coverage	22	17	15	15
Service connected < 50%	21	23	20	18
Not service connected	58	60	65	67
Charlson/Deyo Index 3 or Greater * (%)	12	7	4	4
Current smoker * (%)	25	25	40	54

* p < 0.001 for comparison across alcohol screening groups; VA – Veterans Affairs

Probability of Admission to an Intensive Care Unit in the Year Following Alcohol Screening

TABLE 2

	No Past Year Use (n = 246,704)		Lower-Risk Use (n = 195,265)		Moderate Misuse (n = 28,336)		Severe Misuse (n = 15,810)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Unadjusted Probability	2.14 ^b	2.08–2.20	1.46	1.41–1.51	1.79 ^b	1.64–1.94	2.55 ^b	2.30–2.80
Fully Adjusted Probability ^a	2.03 ^b	1.72–2.34	1.56	1.31–1.83	1.83 ^c	1.41–2.26	2.45 ^b	1.97–2.94

^a Adjusted for age, race/ethnicity, marital status, VA coverage eligibility, medical comorbidities, and smoking status.

^b $p < 0.001$ when compared to lower-risk alcohol use

^c $p < 0.05$ when compared to lower risk alcohol use

TABLE 3
Probability of Hospital Readmission for Patients Admitted to an Intensive Care Unit

	No Past Year Use (n = 5,268)		Lower-Risk Drinking (n = 2,853)		Moderate Misuse (n = 506)		Severe Misuse (n = 403)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Hospital Readmission within 1 year								
Unadjusted Probability	47.8 ^d	46.5–49.1	42.6	40.8–44.4	41.9	37.6–46.2	56.3 ^d	51.4–61.1
Fully Adjusted Probability ^a	47.6 ^d	45.6–49.4	43.5	41.5–45.4	41.5	38.6–44.5	54.7 ^d	49.3–60.1
Hospital Readmission within 30 days								
Unadjusted Probability	18.3 ^b	17.3–19.3	16.0	14.7–17.3	15.4	12.3–18.5	23.6 ^d	19.5–27.8
Fully Adjusted Probability ^a	18.2 ^b	15.9–20.4	16.3	14.2–18.4	15.4	11.2–19.4	23.1 ^c	18.3–27.8

^aAdjusted for age, race/ethnicity, marital status, VA coverage eligibility, medical comorbidities, and smoking status.

^bp < 0.05 when compared to lower-risk alcohol use

^cp < 0.01 when compared to lower-risk alcohol use

^dp < 0.001 when compared to lower-risk alcohol use