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Use of Web-Based Screening and Brief Intervention for Unhealthy Alcohol Use by Older Adults

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Abstract

Background—While the number of older adults who engage in unhealthy drinking is increasing, few studies have examined the role of online alcohol screening and intervention tools for this population. The objective of this study was to describe characteristics of drinking behaviors among older adults who visited an alcohol screening and intervention website, and compare them to younger adults.

Methods—We analyzed the responses of visitors to AlcoholScreening.org in 2013 (n=94,221). The prevalence of unhealthy alcohol use, behavioral change characteristics, and barriers to changing drinking were reported by age group (ages 21–49, 50–65, 66–80). Logistic regression models were used to identify characteristics associated with receiving a plan to either help cut back or quit drinking.

Results—Of the entire study sample, 83% of respondents reported unhealthy drinking (exceeding daily or weekly recommended limits) with 84% among 21–49 year olds, 79% among 50–65 year olds, and 85% among adults over 65. Older adults reported fewer negative aspects of drinking, lower importance to change, highest confidence and fewer barriers to change, compared to younger adults. In the adjusted model, females (AOR=1.45, $p<0.001$) and older adults (AOR=1.55, $p<0.002$) were more likely to receive a plan to change drinking behaviors.

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Discussion—An online screening and intervention tool identified many older adults with unhealthy alcohol use behaviors and most were receptive to change. Web-based screening and interventions for alcohol use have the potential to be widely used among older adults.

Keywords

Older adults; alcohol use; screening; internet

1. Introduction

Unhealthy alcohol use is common in the United States (Moyer & Preventive Services Task Force [USPSTF], 2013) and accounts for significant disability and preventable death (Jonas et al., 2012a; Jonas et al., 2012b; Murray & Lopes, 1996). Unhealthy alcohol use is commonly defined as the use of alcohol that includes risky use, problem drinking, and alcohol use disorder (Saitz, 2005). Brief screening can identify people with unhealthy alcohol use and coupled with brief interventions, can improve outcomes (Moyer, Finnery, Swearingen, & Vergun, 2002). Screening and behavioral counseling interventions for unhealthy alcohol use are therefore recommended by the U.S. Preventive Services Task Force (USPSTF) (Moyer & USPSTF, 2013). However, many individuals are never screened or do not receive interventions even if they screen positive for unhealthy alcohol use (Friedman, McCullough, & Saitz, 2001; Weisner & Matzger, 2003). Barriers to screening for unhealthy alcohol use in the healthcare system include lack of time and challenges of integrating screening into routine clinical workflow (Anderson, Laurant, Kaner, Wensing, & Grol, 2004; Friedman et al., 2001; Johnson, Jackson, Guillaume, Meier, & Goyder, 2011; McCormick, Cochran, Back, Merrill, Williams, & Bradley, 2006; Spandorfer, Israel, & Turner, 1999; Sterling, Kline-Simon, Wibbelsman, Wong, & Weisner, 2012). Due to these challenges, web-based screening and intervention for unhealthy alcohol use has garnered increasing interest (Dedert et al., 2015; Ritterband & Tate, 2009; White et al., 2010).

Web-based screening and interventions for alcohol and other substance use have focused on younger populations, such as university students (Arnaud et al., 2016; Bewick et al., 2008; Tait & Christensen, 2010), and adult workers mostly under the age of 65 (Boon et al., 2011; Dedert et al., 2015; Westrup et al., 2003). Although alcohol is the most common substance used among older adults (Blazer & Wu., 2009b; Holroyd & Duryee, 1997; Kuerbis, Sacco, Blazer, & Moore, 2014; Merrick et al., 2008; Moore et al., 2009), and rates of alcohol use disorder among older adults are expected to rise considerably with the aging Baby Boomer generation (Han, Gfroerer, Colliver, & Penne, 2009), only two studies have focused on online screening tools for older adults (Fink et al., 2016; Kuerbis, Hail, Moore, & Meunch, 2017).

While a recent study showed dramatic increases of both binge drinking (19.2% relative increase) and alcohol use disorder (23.3% relative increase) from 2005–2006 to 2013–2014 among older adults (Han, Moore, Sherman, Keyes, & Palamar, 2017), older adults are less likely to be screened for unhealthy alcohol use (Duru et al., 2010; Kuerbis et al., 2014; Oslin, 2000). While older adults use the internet at lower rates compared to younger populations, there have been significant increases in digital health utilization by the older

population (Levine, Lipsitz, & Linder, 2016). With evidence that online alcohol screening and intervention can benefit certain populations (Deder et al., 2015; White et al., 2010), online tools have the potential to increase screening and provide access to interventions for older adults with unhealthy alcohol use.

AlcoholScreening.org, supported by the Partnership for Drug-Free Kids and the Boston University School of Public Health, is a website that originated in April 2001. The website provides free and anonymous online self-assessment of alcohol consumption patterns and identifies individuals with unhealthy alcohol use. The website also provides personalized education and referral for help with alcohol problems. To better understand the prevalence and characteristics of older adults who visit this site that screens and provides brief intervention for unhealthy alcohol use, and to compare them to younger and middle-aged adults, we examined data from those visiting the website in 2013.

2. Materials and Methods

2.1. Website

AlcoholScreening.org provides a free and anonymous online self-screening tool to assess alcohol use and provide feedback, and is designed based on the health belief model (Andreasen, 1995). A description of the development of the website and how it was disseminated to the public can be found elsewhere (Saitz et al., 2004). The website meets the USPSTF standard for a brief intervention: normative feedback; advice; and assistance in developing a plan to change (Moyer & USPSTF, 2013). The screening protocol is based on the National Institute on Alcohol Abuse (NIAAA) and the U.S. Department of Agriculture (USDA) defined drinking levels in the last 30 days “frequency and quantity” questions and guidelines (NIAAA, 2016a; Department of Health and Human Services [DHHS] & USDA, 2015).

Normative feedback tells the individual whether his or her reported consumption is likely to be “safe” or if it exceeds recommended low risk drinking limits. The definition of low risk limits for the website include 7 drinks/week and 3 drinks on a single day for women and men over the age of 65, and 14 drinks per week and 4 drinks on a single day for men aged 65 based on NIAAA and USDA guidelines (NIAAA, 2016a; DHHS & USDA, 2015). The feedback compares the person’s drinking to a national norm for gender and invites the participants who exceed low risk limits (i.e., unhealthy drinking) to participate in answering more questions that may lead to a plan to change (i.e., a brief intervention). If the respondent does not exceed either weekly or single day limits, they view a final web page that says: *“Your answers suggest that alcohol is not likely to be harming your health because you don’t drink more than the USDA Recommended Guidelines.”* If the respondent reports exceeding either weekly or single day limits, they are given a message about risk of harm to health or injury and asked the following: *“To help you learn more about your drinking, may we ask you a few more questions?”* If they choose “Yes” they are given questions to answer including rating how important it is to them to make a change in their drinking; what negative consequences they associate with drinking; how hard it will be to make a change; and the barriers they see in their way. Feedback associated with their answers is immediate, and they are asked if they would like to receive a plan to reduce or stop their drinking. Those

who choose to continue are provided with advice about effective ways to overcome their fear of failure and the barriers they have identified. The concluding screen is a summary of the session presented as *My Plan for Change* that the participant can download and print. If they choose “No” to the initial invitation to answer more questions about their drinking, they are routed to a page that seeks to understand why they do not want to engage and offers suggestions for the person to participate in the brief intervention.

2.2. Questions and Measures

Data were collected anonymously by the website and are unable to be traced to any identifiable individual. Participants are asked to provide their current age, gender, and zip code, but no other personal information is collected. Information on alcohol use patterns collected include the largest number of drinks consumed in a single day in the past month (response options 0–10), average number of drinking days per week (1–7), number of drinks consumed on a typical drinking day (0–10). We calculated number of drinks per week from the number of drinking days per week and number of drinks consumed on a typical drinking day.

For respondents who exceed recommended alcohol use guidelines, the follow up questions on alcohol use behaviors include: “How important is it to change your drinking?” (0 not important-10 important); “What’s not so good about your drinking?” (18 choices are provided e.g. I get hangovers, it’s affecting a relationship, see Table 3 for all choices); “If you did decide to change your drinking today, how confident are you that you could do it?” (0 not confident-10 confident); “Take a look at the common barriers to changing your drinking below, and check the ones that you think may make it difficult for you too.” (7 choices are provided e.g. my friends and family drink, see Table 3 for all choices); “Do you want to explore ways to quit using alcohol all together or to cut back on the amount of alcohol you drink?” (Yes/No). If respondents click the next page they then receive a plan for change.

2.3. Study Sample

We limited this study to a sample of users of the website between January 1st and December 31st, 2013 between the ages of 21–80. Adults over 80 were excluded due to the limited number and many responses of age 99, which are unlikely to be accurate. We divided the visitors into three age groups to represent younger adults (age 21–49 years old), middle-aged adults (50–65 years old), and older adults (66–80 years old).

2.4. Definition of unhealthy alcohol use

For our analytical sample, among all ages and by the three age groups, we calculated the proportion of site visitors who exceeded safe drinking limits (for descriptive purposes defined as unhealthy alcohol use) as defined by the NIAAA that includes the lower recommended drinking limits for older adults. For our analysis, these were defined as: a) for women of all ages and men >65 years of age as 4 or more drinks in one day or 8 or more drinks per week and b) men 65 years and younger as 5 or more drinks in one day or 15 or more drinks per week (NIAAA, 2016a; NIAAA 2016b; HHS & USDA, 2015).

2.5. Statistical Analysis

Descriptive analysis of user responses was used to report demographic characteristics and alcohol use patterns with use of chi-square and *t* tests when appropriate. Bivariate analyses were used to examine differences in alcohol use patterns by age group. To identify the characteristics associated with respondents receiving a plan for change (either cutting back or quitting alcohol), a multivariable logistic regression model was used with all covariates with all else being equal, producing an adjusted odds ratio (AOR) for each level of each covariate with a 95% confidence interval. To further quantify the magnitude of the differences in AORs for different variables, percentage change in odds were calculated for the continuous variables (scores of importance of change in drinking, confidence to make a change in drinking, barriers to make a change in drinking, and number of items “not good about drinking”) using the maximum number of items or responses for each variable (Long, 1997). Using the percentage change in odds predicts the corresponding scale of change in odds for incremental differences in the survey responses.

3. Results

Between January 1st and December 31st, 2013, there were 148,760 site visitors who began the survey, of this number 106,680 (71.7%) reported having alcoholic beverages and completed questions regarding quantity and frequency of drinking. Of the remaining respondents, 94,221 or 63.3% of the total site visitors met our study criteria (age between 21 and 80) and were included in the analysis. As is common with online surveys, the numbers of the study sample who answered each subsequent question were successively lower with each question; the first question’s response rate was 73.6% and the response rate for the final question was 51.2% (See Figure 1). Also, given the large sample size, we observed statistically significant differences among the three age groups for all the analyses conducted with one exception.

The mean age was 38.8 years (standard deviation [SD], 13.2) of those completing the screening questions, with 72,172 (76.6%) in the 21–49 age group, 19,273 (19.7%) in the 50–65 age group and 2,776 (3.7%) in the 66–80 age group. Of all the respondents, 59% were male and 41% were female. Unhealthy drinking (either exceeding daily or weekly limits) was reported by 83% of those answering the screening questions (N=78,663). By age group, 84% of respondents age 21–49 (N=60,976) reported unhealthy drinking (exceeding either daily or weekly limits), 79% of respondents age 50–65 (N=15,316), and 85% of those in the 66–80 age group (N=2,371). The characteristics of those who completed the screening questions and identified as unhealthy drinkers are shown in Table 1. Overall, 59% were male, and 41% were female and the older adult group had the lowest proportion of older women. Among adults reporting unhealthy drinking, most reported binge drinking (94%). Comparing the three age groups, a lower proportion of older adults exceeded daily alcohol use limits (78%) compared to middle-aged (88%) and younger (96%) adults, and a higher proportion of older adults exceeded the weekly alcohol use limit (96%) compared to middle-aged (86%) and younger (75%) adults.

Responses to questions related to behavioral change characteristics are shown in Table 2. Compared to the other age groups, older adults had the lowest mean number of items

checked in response to the prompt “What is not good about your drinking?”, the lowest mean score for importance to change drinking, the highest confidence to change drinking and the fewest barriers to change. Table 3 shows the specific responses to items for two behavior change-related items overall and by the three age groups. The first question: “What’s not so good about your drinking?” includes 18 items. Between 42 to 50% of all respondents reported these five items: feeling guilty, weight gain, feeling tired, cost, hangovers, and negatively affecting judgment. Among those in the youngest age group, 45 to 51% reported feeling guilty, feeling tired, weight gain, cost and negatively affecting judgment. Among those in the middle age group, 44 to 49% reported weight gain, feeling guilty and feeling tired. Among those in the oldest age group, 30–42% reported weight gain, feeling guilty, feeling tired and negatively affecting their personality. Relatively few endorsed having health problems because of drinking: 12% of youngest, 17% of middle-aged and 15% of older age groups. The second question related to barriers to changing drinking included 7 items. The two most common barriers to changing drinking habits endorsed by more than 40% of all groups were “My friends and family drinks” and “I don’t want to”.

No statistically significant differences were observed between age groups in the proportions of those wanting to explore cutting back drinking versus stopping drinking (Table 4). More than 75% of all age groups wanted to cut back on drinking and fewer than 25% wanted to stop drinking. Of the respondents who indicated they wanted to explore ways to cut back on drinking, most did receive a plan for change but a lower percentage of those in the younger age group received a plan to do so (77%) compared to the middle and older age groups (both 83%). Similar findings were observed among respondents who responded that they want to explore ways to quit drinking. Most received a plan for change but a lower proportion of the youngest age group (80%) received a plan compared to the middle and older age groups (both 86%).

Results from the multivariable logistic regression model (Table 5) suggest that older participants (aged 50–65 and aged 66–80 versus adults aged 21–50) and females (versus males) had higher odds of receiving a plan for change. In addition, respondents who reported a higher importance to change drinking habits, confidence to make changes, higher number of barriers and items not “good about drinking”, and wanted to explore ways to cut back or stop had higher odds of receiving a plan for change. The calculated percentage change in odds for the maximum value of the scale shows that for the importance to change drinking responses, a 1-point increase corresponded to a 13.7% increase in the odds for receiving a plan for change, and for the confidence to change drinking responses, a 1-point increase corresponded to a 24.5% increase in the odds for receiving a plan for change. For the number of barriers and number of items not good about drinking, a 1-item increase corresponded to a 24.6% and 26.2% increase in the odds of receiving a plan for change respectively.

4. Discussion

Evidence suggests that online interventions for unhealthy alcohol use have benefit in adult populations, however almost all studies have focused on adolescents and college students or

adult populations younger than age 65 (Cunningham, Wild, Cordingley, Van Mierlo, & Humphreys, 2010; Cunningham, 2012; Cunningham, Murphy, & Hendershot, 2015; Dedert et al., 2015; White et al., 2010). Our study is the first to our knowledge that characterizes the type of unhealthy drinking (i.e., exceeding daily and/or weekly limits) and behavioral change characteristics by age group that includes older adults who visit an online screening and brief intervention site. With the aging baby boomer generation, there will be many more older adults who drink more than recommended drinking limits. While AlcoholScreening.org likely draws individuals who are already concerned about their drinking habits, our findings show that among older adults aged 66–80 years visiting the website, there was a remarkably high prevalence of unhealthy drinking (85% versus less than 20% in national surveys or clinical settings). Although only a small proportion of older adults (3.7%) visited the website, the high prevalence of unhealthy drinking suggests that online screening and brief intervention tools have the potential to reach a larger population of older adults who engage in unhealthy alcohol use that may not otherwise be recognized. Screening for unhealthy alcohol use for older adults is particularly important because older adults have unique vulnerabilities to alcohol (e.g., increased blood alcohol level per amount consumed, interactions with comorbidity and medications) (Breslow, Dong, & White, 2015; Moore et al., 2006; Moore, Whiteman, & Ward, 2007). Existing research literature has enumerated the most common risks among older drinkers as alcohol-medication interactions (e.g., nonsteroidal anti-inflammatory drugs, sedatives) and alcohol exacerbation of comorbidities (e.g., hypertension, insomnia, gastrointestinal symptoms) (Moore et al., 2006). Yet, at-risk drinking behaviors in the older adult population often continue to go undetected (Duru et al., 2010; Oslin, 2000), and older adults themselves may not be aware of the unique risks of alcohol use as they age (Masters, 2003).

In recent years, web-based screening and intervention for unhealthy alcohol use, such as AlcoholScreening.org, has accrued increasing popularity as a modality that may address existing barriers to care at a low cost (Saitz et al., 2004). In a 2011 meta-analysis by Riper et al., internet interventions had a medium effect on the reduction of adult problem drinking in the general population up to 6 or 9-months post-treatment, as compared with no intervention, with extended interventions trending more efficacious as compared to single sessions (Riper et al., 2011). Another meta-analysis by White et al. published in 2010, found populations less likely to access traditional alcohol-related services, particularly women, young people, and at risk users, to derive benefit from online modalities (White et al., 2010). While online screening and interventions for alcohol use is still an emerging area for research (Dedert et al., 2015), to date among older adults there are only two studies of web-based alcohol education or feedback that have been published. One feasibility study included 96 adults aged 55 years and older recruited at a community-based social services organization serving Los Angeles County (Fink et al., 2016). This study tested the efficacy of 9 web-based educational modules to educate study participants (most of whom were not unhealthy drinkers) about alcohol risks and reduce alcohol use compared no education. Almost all intervention participants (94%) reported little or no difficulty with using the website and 67% reported it may change their drinking habits, but there were no differences in self-reported quantity and frequency of alcohol use among the intervention group compared to control participants at the end of a 4-week period (Fink et al., 2016). The other

study was a feasibility study that compared online normative versus personalized feedback among 138 adults 50 and older (Kuerbis et al., 2017). This study showed feasibility and that normative feedback outperformed personalized feedback in planning for change and showed that study participants most preferred internet based interventions over in-person counseling, text messaging, or telephone counseling sessions (Kuerbis et al., 2017). Our findings suggest that for the relatively few older adults visiting AlcoholScreening.org, they not only have a high prevalence of unhealthy alcohol use, but that older adults with unhealthy drinking habits are receptive to receiving an online plan to help change their drinking behaviors. Future research should focus on how web-based interventions can be used to screen for and intervene to reduce unhealthy alcohol use among older adults.

Our study also describes several key behavioral change characteristics among a population of older adults who reported unhealthy drinking levels and sought out feedback regarding their drinking behaviors. Older adults (aged 66–80) in this study identified the lowest mean of items “not good about drinking” and the lowest score on the importance of changing drinking habits. These findings may be because, consistent with the literature, older adults may not fully understand the risks of drinking, define moderate use above recommended limits, or do not think cutting down on drinking levels is important (Masters, 2003; Morgan et al., 2009; Villiers-Tuthill, Copley, McGee, & Morgan, 2016). In addition, while most internet interventions for alcohol misuse have been designed for younger populations (e.g., college students) (Arnaud et al., 2016; Bewick et al., 2008; Tait & Christensen, 2010), our findings showed some differences in responses to specific items to both “what is not good about drinking” and “barriers to changing drinking habits” between younger and older adults. These differences between age groups could suggest that interventions may need to be specifically targeted by age group since there are somewhat different risks associated with drinking and potentially different attitudes towards alcohol use as well as barriers to changing drinking habits. Future studies are needed to better understand these potential differences between younger and older adults. This study also found that older adults were the most confident in changing drinking habits and reported the fewest barriers to change drinking, which may in part explain why the oldest age group had the highest odds of receiving a plan for changing drinking habits. As our results show high levels of unhealthy drinking across all age groups, it is likely that such websites attract adults who are already thinking about their drinking and may be receptive for information and possible change. Therefore, online screening and intervention is likely to reach an often-undetected older population that is receptive to interventions to decrease drinking behaviors, and be immediately available when the individual seeks it.

Our study also points at possible differences towards changing drinking behaviors between males and females among older adults, as females were more likely to receive a plan for change. While generally older men have higher rates of unhealthy alcohol use compared to older women (Blazer & Wu., 2009a; Han et al., 2017; Merrick et al., 2008; Moore et al., 2009), binge drinking and alcohol use disorders are increasing significantly among older women (Han et al., 2017). However, there is little research that focuses on understanding the unique attitudes towards drinking and barriers to changing drinking behaviors by older women. Examining such differences between men and women was outside the scope of this paper, but we will provide these data in a subsequent paper. In addition to this forthcoming

paper, however, additional studies of online screening and brief intervention tools that delineate differences between older men and older women are needed. Finally, research that includes more of a representative sample of older adults who engage with online screening and intervention tools is needed to better understand differences in its use between younger adults.

4.1. Limitations

This study has important limitations related to online screening and intervention tools such as AlcoholScreening.org. First, it relies solely on anonymous self-report of participants to the website, and therefore there is no way to confirm the accuracy of the self-reported responses. This is a major limitation for all web-based questionnaire assessments (Buchanan, 2003), however our study has additional limitations as a free online screening tool. First, it is likely that our study sample overestimates individual respondents since a participant may have visited the website multiple times. Furthermore, individuals with multiple visits may have answered questions differently to see how survey responses would change (for example inputting different ages or number of drinks). In addition, while social-desirability bias may be limited due to the confidential and anonymous nature of the website, the self-reported responses may be subject to recall bias. Also, the number of respondents by the study sample who answered each subsequent question was successively lower with each question, therefore analysis for later questions are subject to nonresponse bias. Further, it is possible that there may be a systematic bias where certain groups (e.g., university students or younger adults) may be more likely to be directed to the website and/or to seek out the website than others (e.g., older adults) which may contribute to the large difference in the number of respondents in each age group. This potential bias limits the comparisons made in this study between different age groups. While we cannot detect clinically significant differences between age groups this study does illustrate differences and overlaps between older and younger drinkers. Finally, generalizability is strictly limited to internet users who visited AlcoholScreening.org for alcohol screening, and therefore cannot provide accurate population estimates regarding the prevalence of unhealthy alcohol use.

5. Conclusions

Across age groups, most site visitors to AlcoholScreening.org in 2013 exceeded recommended drinking limits, and almost a quarter of them were aged 50 years and older. This website identified a large proportion of older adults with unhealthy drinking habits, most of whom were receptive to a plan of change related to drinking behaviors. Older adults reported some different behavior change characteristics and identified different barriers to changing drinking habits compared to younger adults. While web-based screening and intervention can provide immediate help for users with unhealthy drinking, these tools may be more effective for older adults if they are tailored for them to include risks associated with drinking and barriers to change that are more common in older age groups. Given the demographic imperative of the aging population who are unhealthy drinkers, additional options to address screening and intervention targeting them, such as web-based screening and interventions are urgently needed.

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Highlights

- Alcoholscreening.org identified many older adults with unhealthy alcohol use.
- Most screened for unhealthy use were interested in changing their drinking.
- Web-based screening has the potential to be used widely among older adults.

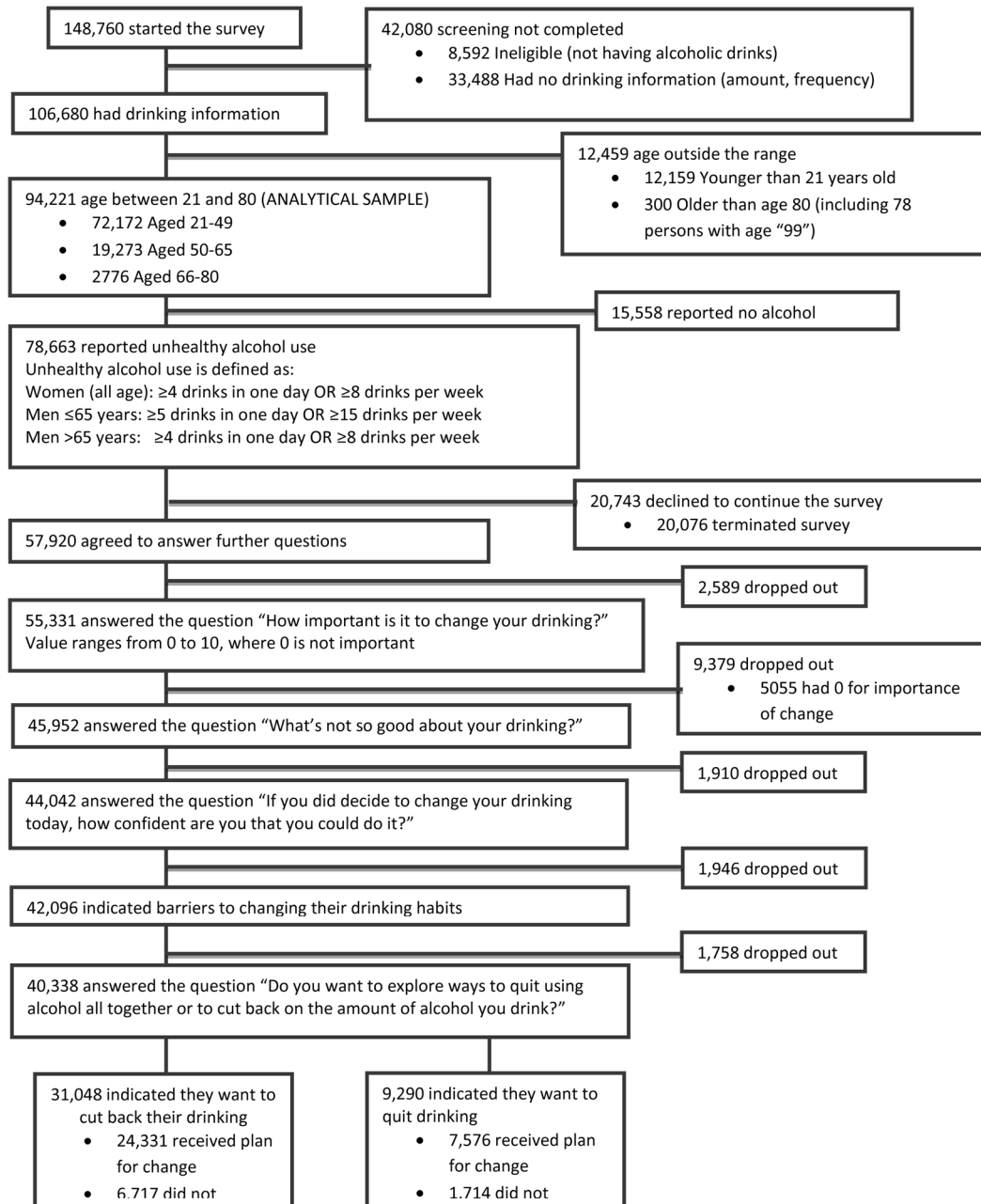


Figure 1.
Flowchart of participants in study sample

Table 1

Characteristics of web site visitors who reported unhealthy drinking by age group, N (%)

Characteristics	Total N=78,663	Age 21–49 N=60,976	Age 50–65 N=15,316	Age 66–80 N=2,371
Gender				
Male	46385 (59)	36092 (59)	8712 (57)	1581 (67)
Female	32278 (41)	24484 (41)	6604 (43)	790 (33)
Unhealthy drinking (exceed daily or weekly limit)	78663 (100)	60976 (100)	15316 (100)	2371 (100)
Exceeded daily limit (binge)	73786 (94)	58409 (96)	13519 (88)	1858 (78)
Exceeded weekly limit	61383 (78)	45953 (75)	13165 (86)	2265 (96)
Both (binge and exceeding weekly limit)	56506 (72)	43386 (71)	11368 (74)	1752 (74)

Number in parentheses are percentages in the selected age group, columns are not mutually exclusive.

P-value <0.001 for all characteristics between all age groups

Table 2

Behavioral change characteristics of respondents who reported unhealthy drinking and completed the survey by age range

Behavioral Change Characteristics	Total	Age 21–49	Age 50–65	Age 66–80
Total items checked for “not good about drinking”, mean, SD (n=45,952) ^a	4.97 (3.50)	5.24 (3.57)	4.20 (3.14)	3.15 (2.52)
How important is it to change your drinking (scale of 0 to 10), mean, SD (n=55,331) ^b	6.21 (3.39)	6.15 (3.38)	6.51 (3.38)	5.86 (3.42)
If you did decide to change your drinking today, how confident are you that you could do it? (scale of 0 to 10) mean, SD (n=44,042)	5.91 (3.10)	5.84 (3.11)	6.05 (3.09)	6.59 (2.94)
Total items checked for “barriers to change”, mean, SD (n=42,096)	2.18 (1.16)	2.27 (1.19)	1.93 (1.05)	1.74 (0.90)

^a18 total items

^b7 total items

P-value <0.001 for all characteristics between all age groups

Table 3

Responses to choices related to behavior change, by age range, N (%)

Responses to “What is not good about your drinking”				
Characteristics	ALL N=45,952	Age 21–49 N =35,198, 77%	Age 50–65 N =9,448, 21%	Age 66–80 N =1,306, 3%
I get hangovers	19506 (42)	16710 (47)	2617 (28)	179 (14)
I have health problems because of my drinking	6047 (13)	4252 (12)	1595 (17)	200 (15)
I’ve been in a car accident	2410 (5)	2050 (6)	319 (3)	41 (3)
I’ve been injured as a result of my drinking	6640 (14)	5625 (16)	922 (10)	93 (7)
I’ve been stopped by police for a DUI	5839 (13)	4815 (14)	941 (10)	83 (6)
I’ve blacked out	14798 (32)	12691 (36)	1938 (21)	169 (13)
I’ve gained weight	22036 (48)	16831 (48)	4657 (49)	548 (42)
I’ve gotten in trouble at work	4110 (9)	3535 (10)	554 (6)	21 (2)
I’ve gotten in trouble with friends or family	15117 (33)	12033 (34)	2768 (29)	316 (24)
I’ve gotten into a fight	6672 (15)	5793 (16)	815 (9)	64 (5)
It costs a lot	19975 (43)	16507 (47)	3143 (33)	325 (25)
It gives me skin problems	4225 (9)	3470 (10)	694 (7)	61 (5)
It has negatively affected my judgment	19436 (42)	15822 (45)	3280 (35)	334 (26)
It makes me feel guilty	22764 (50)	17987 (51)	4335 (46)	442 (34)
It makes me tired	21597 (47)	17039 (48)	4112 (44)	446 (34)
It negatively affects my personality	17025 (37)	13340 (38)	3295 (35)	390 (30)
It’s affected a relationship	18048 (39)	14172 (40)	3496 (37)	380 (29)
Someone else has been injured as a result of my drinking	1911 (4)	1655 (5)	238 (3)	18 (1)
Responses to “Barriers to changing drinking habits”				
Characteristics	ALL N=42,096	Age 21–49 N =32,206, 77%	Age 50–65 N =8,676, 21%	Age 66–80 N =1,214, 3%
Alcohol is part of my culture	15520 (37)	12260 (38)	2821 (33)	439 (36)
I can’t say no	15116 (36)	12011 (37)	2816 (32)	289 (24)
I don’t want to	20152 (48)	15238 (47)	4265 (49)	649 (53)
I have withdrawals when I don’t drink alcohol	6518 (15)	5151 (16)	1226 (14)	141 (12)
I work in the alcohol industry (including bars)	1961 (5)	1817 (6)	136 (2)	8 (1)
My friends and family drinks	26437 (63)	21232 (66)	4654 (54)	551 (45)
Networking for my job often involves alcohol	6153 (15)	5325 (17)	793 (9)	35 (3)

P-value <0.001 for all characteristics between all age groups

Table 4 Prevalence of respondents who request ways to quit or cut down alcohol and received a plan, by age group, N (%)

Characteristics	Total N=40,338	Age 21-49 N=30,835	Age 50-65 N=8,336	Age 66-80 N=1,167	p-value
Want to explores ways to quit using alcohol or cut back on the amount of drinking, n (%)					
Cut back on drinking	31048 (77)	23766 (77)	6362 (76)	920 (79)	0.107
Stop drinking	9290 (23)	7069 (23)	1974 (24)	247 (21)	
Received plan for cutting back on drinking, n (%)	Total N=31,048	Age 21-49 N=23,766	Age 50-65 N=6,362	Age 66-80 N=920	p-value
	24331 (78)	18306 (77)	5267 (83)	758 (83)	<0.001
Plan received for quitting use of alcohol, n (%)	Total N=9,290	Age 21-49 N=7,069	Age 50-65 N=1,974	Age 66-80 N=247	p-value
	7576 (82)	5659 (80)	1705 (86)	212 (86)	<0.001

Number in parentheses are percentages in the selected age group, columns are not mutually exclusive.

Table 5

Multivariable logistic regression predicting receiving a plan for change

Characteristic	AOR	Lower limit	Upper limit	Percent change in odds (%) [*]	p-value
Female sex	1.453	1.382	1.528	NA	<0.001
Age 50–65 vs Age 21–50	1.433	1.341	1.531	NA	0.007
Age 66–80 vs Age 21–50	1.591	1.379	1.837	NA	<0.001
Importance of change in drinking	1.137	1.127	1.148	13.7	<0.001
Confidence to make a change in drinking	1.022	1.014	1.031	24.5	<0.001
Number of barriers to make a change in drinking	1.045	1.021	1.07	24.6	<0.001
Number of items “not good about drinking”	1.014	1.005	1.023	26.2	0.002
Want to explore ways to cut back vs stop drinking	1.139	1.067	1.217	NA	<0.001

AOR= adjusted odds ratio

CI= confidence interval

^{*} Applicable for continuous variables only