Web-based screening and brief intervention for the spectrum of alcohol problems

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Abstract

Context. Many persons who drink excessively remain unidentified and do not receive interventions. Screening and intervention using the World Wide Web could make such services more accessible and therefore more widely used.

Objective. To evaluate the use of a novel alcohol screening and brief intervention Web site.

Design. A Web site was developed, posted, and its use was evaluated. We analyzed a sample of visitors who completed alcohol screening over a 14-month period to describe their alcohol use, and their use of portions of the Web site that provide information and referral resources.

Setting. The Internet.

Patients or other participants. Web site visitors, with a focus on visitors who completed an alcohol-screening questionnaire about their own drinking.

Intervention. Brief intervention via the Web site, consisting mainly of feedback, advice, and a menu of change options and referral information.

Main outcome measures. Self-reported drinking amounts and alcohol screening test scores, and utilization of Web site components.

Results. Visitors completed online alcohol screening questionnaires at a rate of 50,711/year of 115,925 visitors/year. In a 14-month period, 39,842 adults completed the questionnaire about their own drinking habits; 66% were men, 90% reported drinking hazardous amounts (per occasion or typical weekly amounts), 88% reported binge (per occasion) drinking, and 55% reported typically exceeding weekly risky drinking limits. Most (65%) had alcohol screening test results (AUDIT ≥ 8) consistent with alcohol abuse or dependence; similar proportions of women and men were hazardous drinkers. One-fifth of visitors visited portions of the Web site that provided additional information about alcohol use and referrals. Visitors with possible alcohol abuse or dependence were more likely than those without these disorders to visit a part of the Web site designed for those seeking additional help (33% vs. 8%, P < 0.0001).

Conclusions. A well-publicized, easily accessible, research-based screening and intervention Web site can attract many users, most of whom are drinking excessively, and many of whom avail themselves of referral information after receiving individualized feedback.

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Introduction

Alcohol use disorders are costly and a leading cause of disability and death worldwide [1,2]. Brief screening tools can identify people with alcohol problems, and, once identified, those people can receive brief interventions [3,4]. But many people with alcohol use disorders do not seek care nor are they screened even when they contact the health care system [1,5,6]. Barriers to seeking care include
lack of motivation to change, beliefs about treatment, attitudes, fear of discrimination or job loss if detected, and lack of perceived effective access to care [7–9]. Active screening followed by intervention can improve patient outcomes for problem drinkers, and improve access to specialty treatment for those with dependence [3,10]. Despite these available options, many people remain unidentified and untreated [11,12].

Most screening and brief intervention programs have been designed for health care settings, usually paper and pencil questionnaires or in-person interviews [3]. Web-based measures of alcohol use appear to be at least as reliable as these older methods [13]. Using the Internet for screening has the potential to greatly increase the number of people screened and improve access to brief intervention. More than half of all U.S. adults use the Internet and more than half of these Internet users search for health information online (77 million people); 8% of Internet users (9 million people), 14% of young adult Internet users (18–29 years old), and 7% of middle-aged adult users (30–49 years old) have searched for information on alcohol or drug problems [14].

AlcoholScreening.org provides online self-assessment tools and health-based information to help individuals identify their own risky drinking patterns or current alcohol problems. The site delivers personalized feedback and helps users locate assistance if they are ready to seek help. In this paper, we describe the development of the Web site designed to anonymously screen adults and provide personalized online feedback regarding alcohol use, and the feasibility of its use for alcohol screening on the Web. After creating and posting the Web site, we tested whether this Web site was used widely, whether it reached a target population of hazardous drinkers, and whether these persons would seek further assistance from the site when appropriate.

Methods

Web site design

AlcoholScreening.org is an anonymous, free online self-screening service to assess an individual’s alcohol consumption and its consequences. AlcoholScreening.org was based on the health belief model [15]. According to the core concepts of the health belief model, risky drinkers are more likely to reduce their alcohol consumption or otherwise control their at-risk behavior when they believe the threats are real, the benefits of change are valuable, and the barriers to behavioral changes are lessened. With these concepts in mind, AlcoholScreening.org was created as a vehicle to provide the user with personalized feedback speaking directly to the issues of risks, benefits, and action steps. Additional features were created to provide supplemental information for Web site users wishing to take action.

Visitors to this Web site answer 12 questions about their drinking and an additional question for research purposes, and are presented with results that outline the likelihood that their reported drinking patterns indicate risky or harmful alcohol consumption. Visitors may also access an online library of health information about alcohol consumption and alcohol problems, search a national database of substance abuse treatment facilities, or follow links to additional information online. All users are presented with a disclaimer emphasizing that the Web site does not provide a medical diagnosis and cannot substitute for a full evaluation by a health professional.

Visitors complete an online version of the Alcohol Use Disorders Identification Test (AUDIT) [16]. In addition to the 10 AUDIT questions, users are asked two additional questions to further detail the quantity and frequency of their alcohol consumption, and whether their responses reflect their personal alcohol consumption patterns. These questions read:

- “Thinking about a typical week, on how many days do you have at least one alcoholic drink? (If you don’t drink every week, answer for a typical week in which you do);”
- “Thinking about the past year, what is the greatest number of drinks you’ve had on any one occasion?”; and
- “Optional: This question is for research purposes only: I am completing this test based upon my own alcohol-use experience OR I am just curious about the test and the related feedback, or answered the questions with someone else in mind.”

Upon completion of the online screening test, users receive nonjudgmental feedback based on their AUDIT score [17], the current U.S. Department of Agriculture Dietary guidelines for moderate alcohol consumption [18], and U.S. alcohol consumption norms [19]. Feedback is based on the principles of successful brief interventions [20] and distinguishes between drinking amounts that place people at risk for future consequences, and drinking with consequences that have already occurred [21,22]. All users are advised whether their screening results indicate a likelihood of hazardous or harmful alcohol consumption, and all are informed about current guidelines for low-risk drinking. In addition, links are provided to alcohol and health information, and the site provides the option of searching a national database of substance abuse treatment facilities for local, in-person assistance. A traffic light theme is graphically incorporated into the site to help illustrate the screening results.

Users scoring below eight on the AUDIT and whose alcohol consumption falls within the U.S. Dietary guidelines for moderate alcohol consumption are presented with a “green light” results page. They are told that their alcohol consumption appears to fall within healthy limits, but are warned that there are certain circumstances when any amount of alcohol may not be safe, for example, when operating a vehicle or machinery, while pregnant, or if certain medical conditions exist.
Those scoring below eight on the AUDIT, but who exceed the U.S. Dietary guidelines for weekly or per-occasion alcohol consumption see a “yellow light” results page. They are told that while their results do not suggest that a pattern of excess drinking is currently harming their health, the amount they reported consuming on at least one occasion increases their risk for injury or other immediate consequences, or that the amount they reported consuming per week places them at risk for future, mainly chronic, health consequences. They are encouraged to cut down, abstain, or set a safer personal limit for how much alcohol they consume, and, as in the “green light” scenario, are reminded that for some people and in certain situations, no amount of alcohol is safe. In addition, those who exceed weekly alcohol consumption guidelines receive normative information comparing their alcohol consumption to that of the general adult American population and to the adult population of their gender. A sample of this information based on the data provided by a user is: “More than 95% of the general adult American population, and 91% of men consume fewer drinks per week than you reported consuming.”

Users scoring eight or above on the AUDIT are presented with a “red light,” and are told that likely their current drinking is hazardous or harmful to their health and well being. This group also receives normative feedback comparing their alcohol consumption to that of the general adult American population and to the adult population of their gender. They are told that the AUDIT cannot diagnose any condition or tell them for certain if alcohol use is harming their health, and are advised to seek further evaluation from their doctor or other qualified health professional.

At any time, users can follow links to a national alcohol treatment facility database and information on alcohol and health. The treatment database is a current copy of a data set maintained by the Center for Substance Abuse Treatment (CSAT) of the federal Substance Abuse and Mental Health Services Administration (SAMHSA). Further information on alcohol and health is republished by AlcoholScreening.org and provided by U.S. Department of Health and Human Services (U.S. Department of Agriculture and the SAMHSA Center for Substance Abuse Prevention) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA) of the National Institutes of Health (NIH) [18,23,24].

AlcoholScreening.org was launched in April 2001 and has been promoted to the general public in both online and offline modalities. In May 2001, it was featured on hundreds of commercial Web sites in a month-long national banner-ad public service campaign through the DoubleClick advertising network, and received donated banner ad placement on the Boston Globe Web site. The site was featured as a resource on the television program CNN Presents in April 2002 (the month during which National Alcohol Screening Day occurs) [25], and has been linked from online news stories at WebMD, CNN.com, and MSNBC.com. Printed flyers (34,000) were distributed to the public through state and local health departments, alcohol treatment providers, and recovery organizations throughout the United States, and also to every employee of a major U.S. airline through May 2002. The site receives hundreds of daily referrals from Internet search engines (e.g., google.com).

Data collection

Data are collected anonymously by the Web site and cannot be traced to any identifiable individuals. Users are asked to provide their age and gender, but no further personal information is solicited. The responses to all screening questions are recorded to a secure database, as are the results of the real-time computer scoring that determines which feedback module is presented to the user. If, after viewing their screening feedback, a user immediately accesses either the “Learn More” or “Find Help” sections, their choice is recorded and associated with the screening responses and results. The user’s age, gender, screening responses and results, and choice to access the “Learn More” or “Find Help” sections are linked with a record number and stored on a secure password-protected server.

The study of Web site use was approved by the Institutional Review Board at Boston University Medical Center. In addition to recording and reporting herein counts of Web site visits, page views, and completed AUDIT screening tests, we describe a sample of data entered by users between April 2, 2001, and June 2, 2002. These data were entered by users who reported they were adults 18 years or older and who completed the questionnaire. From this description, we excluded Web users who stated that they were “just curious” or that they were answering the questions for someone else.

Results are reported as descriptive statistics (means and standard deviations, proportions), and the chi-square test and t test were used as appropriate for bivariable analyses. We used analysis of variance and Duncan’s multiple range test using \( P = 0.05 \) as the level of statistical significance to compare mean age across three drinking levels. For descriptive purposes, we defined hazardous drinking amounts consistent with NIAAA and U.S. Department of Agriculture recommendations: >14 standard U.S. drinks (13.7 g ethanol) per week for men; >7 drinks per week for women and those 65 years or older; or >4 drinks per occasion for men, >3 drinks for women. We defined those receiving an AUDIT score of \( \geq 8 \) as “possible alcohol abuse or dependence,” those receiving AUDIT scores <8 but exceeding consumption guidelines as “drinking hazardous amounts,” and those with AUDIT scores <8 but not exceeding consumption guidelines as “nonhazardous drinkers.” Drinkers with AUDIT scores of 8 or greater or drinkers of hazardous amounts when referred to together are called “hazardous drinkers.”
Results

Web site use

From April 2001 to May 2003, AlcoholScreening.org received 251,170 visits (115,925/year), with the users spending an average 5 min and 25 s on the site, and yielding 109,874 completed alcohol-screening questionnaires (50,711/year). The total number of completed questionnaires as of May 16, 2004, was 180,123 in 422,324 visits.

Characteristics of Web site users

During our study period, April 2, 2001, to June 2, 2002, 66,548 users visited the site and began completing the online screening; 4,418 did not complete the screening questionnaire; 21,542 questionnaires were completed by users who stated that they were just curious about the test and related feedback or answered the questions with someone else in mind. Of the remaining 40,588 completed questionnaires, 746 users identified themselves as children under age 18 years of age or age 99 or older, and were excluded from further description or analysis. This resulted in 39,842 (35,150/year) valid questionnaires from adults (60% of adult Web site visitors) for analysis.

Of the 39,842 adults completing the screening questionnaire, the mean age was 32 (±SD 11) (range 18–98). Two-thirds of them were men, and 33% were women. Almost all users were drinking hazardous amounts (35,904/39,842, 90% [95% CI 90–90%]; 91% of men, 89% of women); 29% (95% CI 29–30%) of these hazardous drinkers (9,983/35,904) had AUDIT scores <8. More than half of the Web site visitors (21,922/39,842, 55% [95% CI 55–56%]) reported drinking hazardous amounts during a typical week. Most reported drinking binge amounts during the past year (5,181/39,842, 88% [95% CI 88–88%]; 89% of men, 87% of women).

Significantly more adults younger than 65 years old reported exceeding per occasion drinking limits compared with older adults; on the other hand, significantly more adults 65 years of age and older reported exceeding weekly consumption limits than did younger adults (P < 0.0001 for both comparisons) (see Table 1). Two-thirds of adults (25,921/39,842, 65% [65–66%]) had AUDIT scores of 8 or greater (possible alcohol abuse or dependence) (see Table 2). Women were significantly less likely to have scores greater than or equal to 8 (57% [95% CI 56%–58%, 7,556/13,235], compared with 69% [95% CI 68–70%, 18,365/26,607] of men, P < 0.0001) (see Table 3). The median AUDIT score was 10, the score at the 75th percentile was 16, and at the 90th percentile was 23.

Table 1

Age and the prevalence of hazardous per occasion and weekly amounts reported by 39,842 Web site visitors completing Web-based alcohol screening

<table>
<thead>
<tr>
<th>Age</th>
<th>Drinking hazardous per occasion (binge) amounts</th>
<th>Drinking hazardous weekly amounts</th>
<th>Total number in age group</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–24</td>
<td>11,346 (94)</td>
<td>7147 (59)</td>
<td>12,081</td>
</tr>
<tr>
<td>Male</td>
<td>7592 (94)</td>
<td>4550 (56)</td>
<td>8055</td>
</tr>
<tr>
<td>Female</td>
<td>3754 (93)</td>
<td>2597 (65)</td>
<td>4026</td>
</tr>
<tr>
<td>25–34</td>
<td>12,283 (93)</td>
<td>6851 (52)</td>
<td>13,213</td>
</tr>
<tr>
<td>Male</td>
<td>8652 (93)</td>
<td>4491 (48)</td>
<td>9291</td>
</tr>
<tr>
<td>Female</td>
<td>3631 (93)</td>
<td>2360 (60)</td>
<td>3922</td>
</tr>
<tr>
<td>35–64</td>
<td>11,303 (80)</td>
<td>7678 (54)</td>
<td>14,187</td>
</tr>
<tr>
<td>Male</td>
<td>7279 (81)</td>
<td>4563 (51)</td>
<td>8984</td>
</tr>
<tr>
<td>Female</td>
<td>4024 (77)</td>
<td>3115 (60)</td>
<td>5203</td>
</tr>
<tr>
<td>65 and older</td>
<td>249 (69)</td>
<td>246 (68)</td>
<td>361</td>
</tr>
<tr>
<td>Male</td>
<td>195 (70)</td>
<td>183 (66)</td>
<td>277</td>
</tr>
<tr>
<td>Female</td>
<td>54 (64)</td>
<td>63 (75)</td>
<td>84</td>
</tr>
</tbody>
</table>

Numbers in parentheses are percentages of those in the selected age group meeting the column criterion. Columns are not mutually exclusive.

* See text for definitions.

Table 2

Prevalence of hazardous and harmful drinking for 39,842 Web site visitors completing Web-based alcohol screening in selected age groups

<table>
<thead>
<tr>
<th>Age</th>
<th>Nonhazardous drinkers</th>
<th>Drinking hazardous amounts</th>
<th>Possible alcohol abuse or dependence</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–24</td>
<td>673 (6)</td>
<td>2395 (20)</td>
<td>9013 (75)</td>
<td>12,081</td>
</tr>
<tr>
<td>Male</td>
<td>422 (5)</td>
<td>1347 (17)</td>
<td>6286 (78)</td>
<td>8055</td>
</tr>
<tr>
<td>Female</td>
<td>251 (6)</td>
<td>1048 (26)</td>
<td>2727 (68)</td>
<td>4026</td>
</tr>
<tr>
<td>25–34</td>
<td>844 (6)</td>
<td>3501 (27)</td>
<td>8868 (67)</td>
<td>13,213</td>
</tr>
<tr>
<td>Male</td>
<td>586 (6)</td>
<td>2159 (23)</td>
<td>6546 (70)</td>
<td>9291</td>
</tr>
<tr>
<td>Female</td>
<td>258 (7)</td>
<td>1342 (34)</td>
<td>2322 (59)</td>
<td>3922</td>
</tr>
<tr>
<td>35–64</td>
<td>2351 (17)</td>
<td>3976 (28)</td>
<td>7860 (55)</td>
<td>14,187</td>
</tr>
<tr>
<td>Male</td>
<td>1396 (16)</td>
<td>2187 (24)</td>
<td>5401 (60)</td>
<td>8984</td>
</tr>
<tr>
<td>Female</td>
<td>955 (18)</td>
<td>1789 (34)</td>
<td>2459 (47)</td>
<td>5203</td>
</tr>
<tr>
<td>65 and older</td>
<td>70 (19)</td>
<td>111 (32)</td>
<td>180 (50)</td>
<td>361</td>
</tr>
<tr>
<td>Male</td>
<td>55 (20)</td>
<td>90 (32)</td>
<td>132 (48)</td>
<td>277</td>
</tr>
<tr>
<td>Female</td>
<td>15 (18)</td>
<td>21 (25)</td>
<td>48 (57)</td>
<td>84</td>
</tr>
</tbody>
</table>

Numbers in parentheses are row percentages. Percentages may not add to 100 due to rounding. Columns are mutually exclusive.

Table 3

 AUDIT score for 39,842 Web site visitors completing Web-based alcohol screening

<table>
<thead>
<tr>
<th>AUDIT score</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–7</td>
<td>8242 (31)</td>
<td>5679 (43)</td>
<td>13,921 (35)</td>
</tr>
<tr>
<td>18–24</td>
<td>1769 (22)</td>
<td>1299 (32)</td>
<td>2,068 (20)</td>
</tr>
<tr>
<td>25–34</td>
<td>2745 (30)</td>
<td>1,600 (41)</td>
<td>4,345 (43)</td>
</tr>
<tr>
<td>35–64</td>
<td>3583 (40)</td>
<td>2,744 (53)</td>
<td>6,327 (65)</td>
</tr>
<tr>
<td>65 and older</td>
<td>145 (52)</td>
<td>36 (43)</td>
<td>181 (39)</td>
</tr>
<tr>
<td>8–19</td>
<td>13,467 (51)</td>
<td>5,722 (43)</td>
<td>19,189 (48)</td>
</tr>
<tr>
<td>18–24</td>
<td>4,296 (53)</td>
<td>2,002 (50)</td>
<td>6,298 (53)</td>
</tr>
<tr>
<td>25–34</td>
<td>5,150 (55)</td>
<td>1,851 (47)</td>
<td>6,996 (55)</td>
</tr>
<tr>
<td>35–64</td>
<td>3,931 (44)</td>
<td>1,838 (35)</td>
<td>5,769 (38)</td>
</tr>
<tr>
<td>65 and older</td>
<td>90 (32)</td>
<td>31 (37)</td>
<td>121 (34)</td>
</tr>
<tr>
<td>≥20</td>
<td>4,898 (18)</td>
<td>1,834 (14)</td>
<td>6,732 (17)</td>
</tr>
<tr>
<td>18–24</td>
<td>1,990 (25)</td>
<td>725 (18)</td>
<td>2,715 (19)</td>
</tr>
<tr>
<td>25–34</td>
<td>1,396 (15)</td>
<td>471 (12)</td>
<td>1,867 (19)</td>
</tr>
<tr>
<td>35–64</td>
<td>1,470 (16)</td>
<td>621 (12)</td>
<td>2,091 (19)</td>
</tr>
<tr>
<td>65 and older</td>
<td>42 (15)</td>
<td>17 (20)</td>
<td>59 (14)</td>
</tr>
</tbody>
</table>

Numbers in parentheses are column percentages. Columns are mutually exclusive.
Web site visitors with possible alcohol abuse or dependence were significantly younger (mean age 30.9) and more likely to be male (71%) than those drinking hazardous amounts but with AUDIT scores less than 8 (mean 33.6 years, 58% male), and nonhazardous drinkers (mean 39.0 years, 62% male) ($P < 0.0001$).

Men were more likely than women to have possible alcohol abuse or dependence, though the absolute difference was small (88% vs. 84%, OR 1.46, 95% CI 1.36–1.57). Excluding those with possible alcohol abuse or dependence (e.g., those with AUDIT scores 8 or greater), women were slightly more likely to drink hazardous amounts than men (odds ratio 1.21, 95% confidence interval 1.12–1.30).

Web site use after feedback was delivered

Almost one-fifth of the study sample (7,513/39,842, 18.9% [95% CI 18.5–19.3%]) chose the “Learn More” or “Get Help” options after receiving their results. Users with possible alcohol abuse or dependence (21.4% [95% CI 20.9–21.9%], 5,569/25,921) were more likely than users drinking hazardous amounts (18.8% [95% CI 15.1–16.5%], 1,573/9,983), who were more likely than nonhazardous drinkers (9.4% [95% CI 8.5–10.3%], 371/3,938) to choose the “Learn More” or “Get Help” options after they were presented with feedback on their drinking (Mantel-Haenszel Chi-Square test for trend $P < 0.0001$). Furthermore, of those who clicked further after getting feedback, choices were consistent with alcohol use severity: one-third (1,837/5,569, 32.9% [95% CI 31.7–34.1%]) of those with possible alcohol abuse or dependence selected “Get Help” instead of learn more, while only 8% (95% CI 6.8–9.2%, 159/1,944) of site users with AUDIT scores <8 did so ($P < 0.0001$).

Discussion

Creating and widely promoting a Web site for alcohol screening and brief intervention resulted in a significant number of Internet users visiting the site. A majority of visitors completed questionnaires and most questionnaire completers reported they were answering questions about their own drinking. Almost all reported drinking hazardous amounts, or possible alcohol abuse or dependence (AUDIT $\geq$ 8). What may be most remarkable about the characteristics of users of this Web site is the large proportion of women drinkers who are drinking hazardous amounts. While lower than the proportion of male hazardous drinkers in the sample, the prevalence of male hazardous drinkers was only between one and two times that of females, unlike the up to fivefold difference in hazardous drinking identified in men vs. women in primary care settings [4]. And the proportion of women drinking hazardous weekly amounts was higher than that for men. Use of the site was internally consistent: Web users reporting more severe problems were more likely to proceed to screens that offered more information and help. The site was feasible for screening many adults and Web site users were primarily hazardous drinkers, suggesting the possibility of reaching many people, particularly women, who otherwise might not have hazardous drinking identified or addressed.

Internet-based alcohol assessment and feedback has been reported previously. Cunningham et al. [26] posted an anonymous 21-item survey (AUDIT, typical week consumption over the past year, consequences) and materials modified from the Drinker’s Check-up. Cunningham’s Web address (“Try Our Free Drinking Evaluation” at http://notes.camh.net/efeed.nsf/newform) was not designed for widespread easy access though the title of the site may have garnered a number of visits. Furthermore, few of the visits generated completed questionnaires (214 of 1,729 completed questionnaires were by Web users who answered questions about their own drinking). Compared with more frequent and more consistent drinkers, less frequent drinkers and drinkers whose consumption varied a great deal over time found that the feedback given by the site was less credible. Another site, CareBetter.com, included a 43-item questionnaire followed by personalized feedback. The Web address in this case was also not transparent nor was it likely to attract users interested in evaluating their alcohol use [27]. Approximately 20% of visitors to the site completed the questionnaire. During a 172-day period, the site screened just over 2,800 individuals (approximately 10% the rate in the current study). Similar to our study, the prevalence of likely alcohol problems among completers of the questionnaires was high (89% with AUDIT $\geq$ 8).

AlcoholScreening.org can also be compared to another effort to screen general populations, National Alcohol Screening Day [28]. On this day implemented each year since 1999, individuals at community (e.g., hospitals and shopping malls) and primary health care sites and colleges screen volunteers. The day is widely promoted, and conducted nationwide. In community and college screenings, the AUDIT is used as the screening tool. Most of the screening activity occurs on the designated day, and almost all during the week containing that day. In 1999 at 1,089 sites, 18,043 people were screened, 43% had AUDIT scores of 8 or greater (compared with 65% of AlcoholScreening.org visitors), and 5,949 were referred for treatment. In 2002, the program screened almost 45,000 people at 2,863 sites; 12,000 were hazardous drinkers (27% vs. 90% of AlcoholScreening.org visitors) [29].

Web approaches and a national screening day rely on volunteers to seek the screening. As such, the proportion of those screened who have the target condition are relatively high compared with, for example, universal screening in general healthcare settings [30,31]. But many people screened online and at national screening events are either not having regular contact with healthcare settings or are having such contact and not being identified [27,28]. Thus Web-based screening and in-person screens are likely complementary and address problems in different populations.
Furthermore, individuals identified by in-person screening could be referred to use Web-based screening, intervention, and informational materials among other referral resources. There are limitations to this evaluation of AlcoholScreening.org. First, because of concerns about confidentiality and our interest in seeing the feasibility of a truly anonymous screening program, we could not identify unique users of the site nor could we confirm self-reports. As a result, we may have overestimated the number of individual users because individuals may have visited the site more than once and been counted as new users. In addition, when assessing use of the Web site functions that provided more information and referral resources, we only counted users who proceeded to these parts of the site immediately after completed screening because that was the only way to be certain that the screened individual was seeking information. As a result, we may have underestimated the number of Web site users who sought help and information, as individuals may have returned during a separate Web session for this purpose. Conclusions regarding the characteristics of subjects in the sample (e.g., age, gender, alcohol use, response to feedback) should be limited to Internet users who seek and use an alcohol screening Web site. Findings may not generalize to older adults, and to populations known to use the Internet less to seek health information and less in general (e.g., lower income or education level, those without high-speed Internet connections) [14]. Finally, we were not able to assess clinical outcomes in this initial evaluation of this new technology.

Despite these limitations, we can conclude that the Web site was designed based on known valid screening approaches and included research-based intervention components, it was used extensively, and high proportions of users completed the screening. Its extensive use was likely related to concerted efforts to publicize the site, including an easily identifiable Web address recognized by common search engines.

Although screening tests are brief and valid, and professional interventions for hazardous drinking and alcohol abuse and dependence are available, many people do not avail themselves of such services [4,6]. Screening in health-care settings is widely recommended by professional societies but screening and intervention are often not performed [30,32,33]. Some have recently suggested that screening for alcohol problems in primary care settings is inefficient and have questioned whether the effort of screening is worthwhile [31]. Most American Internet users search for health information on the Web and 9 million have searched for alcohol and drug information [14]. In a recent telephone survey, current drinkers chose computerized normative feedback more often than other options (therapist phone call, self-help book) for addressing their alcohol use [34]. Web-based assessments appear to be reliable [13]. But perhaps more importantly, they hold the promise of reaching many individuals who would otherwise receive no information or intervention. One could speculate that if these adults are similar to those seeking alcohol information at AlcoholScreening.org, 8.1 million hazardous drinkers (90% of 9 million) could be screened and receive feedback; a Web-based brief intervention, if as effective as in-person interventions, could decrease the number of hazardous drinkers by 850,000 (absolute risk reduction 10.5%) [31]. This speculation clearly goes beyond data presented herein, and points to topics for further research.

Our data suggest that Web-based screening and intervention can reach many people at low cost. Web site creation and maintenance cost $9,500, and advertising $9,000. Good search engine placement and free media coverage were the primary means of attracting visitors to the site. The volume of visitors assured high level placement in Google and other search engines. In addition, even a minimally effective intervention would have a large public health impact. Additional studies should explore the potential to reach all Internet users seeking alcohol and drug information, and should test the efficacy on drinking and other outcomes.

AlcoholScreening.org is a Web site that has a URL (Web address) with a clear message, it has been widely publicized, and it garners internally consistent responses from site visitors. The site has attracted more visitors than any other alcohol screening intervention Web site to date and it has attracted more visitors per year than a comparable in-person effort, National Alcohol Screening Day. The site has features that make Web-based screening and intervention an important addition to the public health tools available for addressing hazardous drinking: It is anonymous, accessible at any time from anywhere there is Web access, and requires minimal professional staff (and professional contact with users). Hazardous drinkers, particularly women, seek information and feedback at the site. Further research should focus on additional development of Web-based interventions, outcome evaluations using rigorous research designs, cost-effectiveness of various approaches to mass screening for alcohol problems, and research to identify the most appropriate role for Web screening (e.g., how to integrate with health professional care and other efforts such as mass in person screening). Until such results are available, Web sites such as AlcoholScreening.org can be recommended to supplement public health efforts aimed at reducing excessive alcohol use and related problems.

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