Promoting a Web-Based Smoking Cessation Intervention:
Implications for Practice

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Abstract

Despite the large proportions of smokers who want to quit smoking, utilization of empirically-based cessation interventions remains low. Web-based tobacco cessation interventions offer many advantages to smokers seeking assistance in quitting smoking. In an effort to utilize the broad reach of the Internet to engage smokers who are interested in quitting, a multi-channel mass media campaign was launched in 2008, in part to promote a web-based cessation intervention, www.BecomeAnEX.org. This website was designed to offer effective cognitive-behavioral cessation strategies in an engaging digital format. The use of several multimedia site components has the potential to increase engagement, reach, and interest among the online smoker audience. During the first two years of the promotional campaign, nearly 1.5 million unique visitors came to the EX website. Over 15% of all unique visitors registered for the EX Quit Plan. Media placements were used to effectively target segments of the population with higher than average smoking rates among typically under-represented web users.
Introduction

Although rapid declines in adult smoking prevalence were observed during the late 1990s and early 2000s, evidence suggests that this significant progress has slowed and may even have plateaued. Currently, nearly one-fifth of adults in the United States smoke.1 To counteract this recent stall, national groups and tobacco control experts have called for a renewed focus to build “consumer demand” for smoking cessation assistance.2

Utilization of empirically-based interventions has been traditionally low despite the large proportion of smokers (greater than 70%) who report a high desire to quit smoking3 and the growing number of available and effective smoking cessation treatments.4,5 Some suggest that innovative approaches are needed to increase the promotion, satisfaction, and reach of existing interventions to maximize their effectiveness.2 To address this gap, several initiatives have been implemented to promote the utilization of cessation services using multimedia. One such initiative was created by Legacy in collaboration with the National Alliance for Tobacco Cessation (NATC), a coalition of national organizations and state public health programs. This effort included the development of a web-based cessation intervention at www.BecomeAnEX.org.

Web-based tobacco cessation interventions offer many advantages to smokers seeking assistance in quitting smoking. The ease of logging on to the computer at the smokers’ convenience reduces some of the logistical barriers of in-person interventions and appeals to some smokers’ preference for anonymity.6-8 These online interventions have also evolved to incorporate additional interactivity using multimedia components, blogs, social networks, and handheld applications.9-12 Such site components have the potential to increase engagement, reach, and interest among the online smoker audience.

A meta-analysis of the efficacy of web-based cessation programs has found pooled quit rates which range from 14.8%-11.7%, depending on follow-up period (3- and 6-months, respectively),13 and individual site studies have observed quit rates of up to 39% when used in conjunction with pharmacotherapy.14 Early evidence has shown that Internet-based smoking cessation interventions can be effective, especially if the website components are tailored to the individual, and if user engagement is maximized. Although tobacco control simulation models suggest that internet-based interventions may contribute to a decrease in population level smoking rates if promoted sufficiently,15 further research is needed to determine the long-term benefits of such Internet programs.14

During the last decade, mass media promotional efforts have been used to drive consumers to traditional cessation resources such as quitlines.16-21 However, few studies have examined the impact of promotional efforts on traffic patterns and utilization of an online cessation site, particularly the association between the level of television advertising tagged with the site domain and
actual traffic to the referred site.\textsuperscript{22-24} The objectives of this case study are to:

- Describe the development of the free web-based cessation intervention, \textit{www.BecomeAnEX.org}

- Describe the multimedia promotional efforts to increase awareness and utilization of the site

- Examine trends in patterns of site utilization, with respect to the channel and level of multi-media promotional efforts
Developing the Web-Based Cessation Intervention

Establishing the Target Audience

The primary target audience was broadly defined as smokers between the ages of 25 and 49 years who were open to quitting smoking. In 2005 and 2006, using national prevalence and propriety data sources, this broad target audience was segmented to focus on blue collar smokers of low to moderate incomes given their higher smoking rates. These data indicated that a substantial proportion of blue collar smokers were younger, had more technical jobs, and fell into the low to moderate income levels. Interestingly, in 2005, when the campaign was being developed, more than half of the blue collar target audience used the Internet for communication and information, and a growing proportion (over one-fifth) used new interactive digital media, such as watching videos, playing games, and listening to music. Also, at that point in time, only 7% of the target audience participated in an online community, according to the report.

The Intervention

Building on the demographics and preferences of the target audience, a branded smoking cessation website, www.BecomeAnEX.org was designed to engage smokers through videos, interactive content, a personalized quit plan, and an online community of smokers. Site content was based on literature related to cognitive behavioral counseling, smoking cessation, and web-based smoking cessation interventions. All clinical content was reviewed by cessation experts at the Mayo Clinic Nicotine Dependence Center. The site was also translated and culturally adapted to Spanish (www.ConvierteteEnUnEx.org).

Consistent with the 2008 Clinical Practice Guideline, the site provides 1) clear and strong advice to quit smoking; 2) assistance in setting a quit date; 3) assessment of motivation to quit and nicotine dependence; 4) problem-solving and skills training designed to enhance self-efficacy; 5) tailored help in selecting and using FDA-approved smoking cessation pharmacotherapy; and 6) social support (see Table 1, next page).
The entire quit plan on BecomeAnEX.org is free to all visitors, and allows anyone to anonymously browse the site. Visitors can register on the site in order to save their personal information for a customized experience on future visits and participate in interactive exercises. Efforts were made to ensure that the EX site allowed users to access various components of the quit plan in the order they desired, rather than requiring them to complete the program in a step-wise fashion. This strategy was implemented to help ensure that users explore personally relevant sections more readily to increase adherence and utilization of the site.

The site also includes a growing virtual community where smokers who are trying to quit can connect with others to share support and encouragement (see Figure 1, next page). The EX Community is formatted similarly to other well-known social networks, such as Facebook or MySpace. Members are given the opportunity to create a profile page where they can display a brief biography of themselves, upload a photo, and blog about their experiences. Within

<table>
<thead>
<tr>
<th>Clinical Guideline</th>
<th>Corresponding Site Sections of BecomeAnEX.org’s Three-step plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral counseling (Problem-solving skills/training)</td>
<td>“Re-learn Habit” includes the capacity to create customized quit plans, including selecting a quit date and determining and coping with smoking triggers via an interactive tool called the “cigarette tracker.”</td>
</tr>
<tr>
<td>Social support</td>
<td>“Re-Learn Support” supplies connection to a virtual support group or online “Community,” which allows smokers and ex-smokers to share their experiences and challenges. Community members can interact with others in number of ways, including creating a member profile/page, linking to “friends,” creating or reading blog posts, and joining groups.</td>
</tr>
<tr>
<td>Pharmacotherapy</td>
<td>“Re-Learn Addiction” provides information about how nicotine addiction works, including the role that pharmacotherapy, such as nicotine replacement therapy (NRT) and prescription medications, can play in a successful quit. Weekly blog posts from Mayo Clinic’s Dr. Richard Hurt provide smokers with an opportunity to have questions answered by a quit-smoking expert.</td>
</tr>
</tbody>
</table>
the EX Community, members can comment on other members’ “walls” or blogs and join organically formed groups who have some type of shared characteristic (i.e., a quit date in the same month, live in the same geographic region, are using the same quit medication, etc). Recent activity throughout the EX Community is easily accessible through a live newsfeed on the main page.

To help ensure optimal accessibility of BecomeAnEX.org across users of varying educational backgrounds, three rounds of usability testing were conducted at the Enhancing Communication for Health Outcomes (ECHO) Lab at Dana Farber/ Harvard Cancer Center (September 2006, March 2008, and September 2009). Usability testing generally involves measuring how well test subjects respond in four areas: efficiency, accuracy, recall, and emotional response. This testing was conducted among current smokers between the ages of 25-49 who were planning to quit in the next six months and had experience with the Internet to assess general attitudes toward the website and examine the user experience. In-depth navigation tests were used to assess comprehension and navigability. Modifications were made to the site after each round of testing to enhance user experience, and improve registration and use of the site.
An online study of BecomeAnEX.org registered users was also conducted to assess overall consumer satisfaction as part of our continuous quality improvement strategy. For this study, a random sample of registrants (n=1186) were recruited to complete a brief survey. Results reveal high satisfaction levels such that two out of three respondents were extremely or somewhat satisfied with the website, and three quarters were extremely or somewhat likely to recommend the site to a friend or colleague who is trying to quit smoking. The majority of respondents (over 70%) found the quit smoking sections of the site extremely or somewhat helpful and easy to use.
Promotional Advertising

The EX advertising campaign was designed as an independent cessation intervention as well as a promotional mechanism to drive smokers to the EX website. Advertising, which included television, radio, print, out-of-home, and online mediums, launched nationally on March 31, 2008. The development of the brand and messaging strategy has been described previously.25

In an effort to disassociate a smoker’s triggers, the first series of television advertisements, which aired between March 31, 2008 and September 28, 2008, focused on how smokers may have difficulty performing simple, everyday tasks that are typically associated with smoking (e.g. backing a car out of a driveway, drinking coffee, getting ready in the morning). The voice-over in the television advertisements told smokers, “When you’re used to always doing something with a cigarette, it can be hard doing it without one. But if you can learn how to drink coffee [drive, start your day] without cigarettes, then you can learn to do anything without cigarettes.” A second set of television advertisements, which aired between June 1, 2009 and February 15, 2010, also encouraged smokers to rethink situations that are linked to smoking in their daily lives. For example, one advertisement featured a smoker mixing an alcoholic drink at her desk in an office to illustrate that drinking is not always paired with smoking. By showing that some behaviors are already separated in specific situations (i.e., on a smoke-break at work), smokers may begin to engage in disassociating smoking from specific triggers or cues. All advertisements were tagged with the intervention’s website, www.BecomeAnEX.org.

EX television advertisements aired on network, cable, syndicated, and spot television at approximately 45 Gross Ratings Points (GRPs) per week. GRPs are a measure of media exposure that accounts for both the reach and frequency of an advertisement among a targeted population. The media strategy concentrated the advertising during the early weeks of the campaign, and then alternated weeks with a reduced frequency during the later portion of the campaign. State members of the NATC also periodically ran supplemental EX advertising locally with tags to their state quitlines or state health departments, even when national ads were not running. For example, nine of sixteen NATC states (WA, RI, OK, NC, NY, MO, IN, CT, and AR) ran EX television or radio ads in local markets when national EX television and radio ads were not on air.

An evaluation study of the first set of ads indicated that those who were aware of the EX campaign were more likely to have significant positive changes on a cessation cognition index, and had a 24% increased odds of making a quit attempt as compared to those respondents who were unaware.28

The online media strategy to promote BecomeAnEX.org placed banner advertising on websites where a smoker may be going through a life-change or a moment of self-reflection. For example, online advertisements were placed on dating sites, job sites, and other areas to capture web users who may already be looking at ways of improving their life. The appearance of online ads was tailored to the time of day. Examples include an ad featuring coffee that ran in
the morning, while an ad featuring “big lunch” or “job stress” would appear in the afternoon. (See Figure 2 for examples of online advertisements for EX.)

Online media messages were also placed near content relevant to smoking, such as an article on quit smoking treatment or a new smokefree law described on a news site such as www.CBS.com. Behavioral targeting, which bases the appearance of an ad on a user’s web-browsing, was used to help ensure exposure to those who may looking to quit. Efforts at optimizing the BecomeAnEX.org website’s location in an organic web search (search engine optimization) were also utilized and have proven to be a cost-effective way to increase traffic to this site.

Finally, several different strategies were used to optimize online advertising. Both cost per click (CPC) and impression-based

**Figure 2: Banner advertisements for BecomeAnEX.org**
cost per thousand (CPM) strategies were used before settling on a cost-per acquisition (CPA) approach. In a CPC media buy, the advertiser pays a sum each time an ad is clicked, whereas a CPM buy is based on impressions served (i.e., cost per 1000 views of the ad). In a CPA media buy, the cost of running an ad is contingent upon a user completing a certain task. For example, costs were incurred only when a visitor signed up to become a registered user of the EX quit plan. Although the costs for a CPA strategy are somewhat higher, this approach is extremely cost efficient to increase registration, and thereby improve utilization rates. Online advertising ran throughout the entire first two years of the campaign.

Social networking sites were also used to disseminate EX content. The Facebook site for EX (facebook.com/BecomeAnEX) provides weekly message posts on various quitting topics with links to relevant content on BecomeAnEX.org, relevant articles or content from other websites, EX advertisements, and videos on quit-smoking topics like triggers and how nicotine affects the brain. Fans of EX on Facebook can also comment on the Wall, find links to blog postings about smoking cessation from Mayo Clinic’s Dr. Richard Hurt, and use the customized application called “Match Heads” to connect with other Facebook quitters with similar triggers. An EX “badge” is also available for users to post on their own Facebook page, other websites, and blogs to virally transmit the message of EX. For those using microblogs, EX messages are posted daily on Twitter (twitter.com/TheEXTeam).

**Figure 3: EX on Facebook and Twitter**
Evaluation

Data Sources

Two data sources are used to access information on registered users and all visitors to BecomeAnEX.org: 1) Google Analytics, a free web analytics tool, is used to collect aggregate data on all traffic to the website; and 2) a customized linked database is used to store individual-level data of registered user characteristics.

Google Analytics data include 1) visits (one visit or “session” is defined as the period of interaction between a visitor’s browser and BecomeAnEX.org, ending when the browser is closed or when the user has been inactive for 30 minutes); 2) unique visitors (the number of unduplicated visitors who visited the site over a specified time period tracked using cookies); 3) average time spent on site; and 4) average number of pages viewed per visit.

Individual-level data on user characteristics and quit plan utilization are tracked using proprietary software and a custom-built administrative tracking mechanism. To protect its users, Legacy has a comprehensive privacy policy which ensures that 1) the transmission of all health-related information is encrypted; 2) all personally identifiable information is available electronically only through password access; and 3) industry standard network protection and intrusion detection systems are in place. The BecomeAnEX.org privacy policy is available at www.BecomeAnEX.org/privacy-policy.php.

Individual-level data are collected at time of registration through an online registration form. These data include age, gender, race/ethnicity, zip code, and education; smoking characteristics: nicotine dependence (measured as time to first cigarette), readiness to quit (measured as stage of change), cigarettes per day, recent quit attempts (having quit for at least 24 hours during the past year), referral source (i.e. where the user heard about BecomeAnEX.org), and reason for visit. Utilization mechanisms track whether a user views or interacts with key components of the quit plan, such as “Set Your Quit Smoking Date,” the “Cigarette Tracker,” or “Quit Smoking Medication and Myths.” For analytic purposes, registered users are defined as “primary” or “proxy” users based on their smoking status and reason for visit. Primary users only include current or former smokers who were visiting the site for information or assistance to quit smoking or stay quit. Proxy users included never smokers, healthcare providers, and visitors who were using the site to help a friend quit smoking.

Aggregate information related to EX Facebook users are accessed through a dashboard provided by Facebook. For example, data is available on total “likes” of the page, number of interactions with page content (“likes” of content, comments, and wall posts), and page views. Tracking information is not available for Twitter accounts.
Unfortunately, there is currently not a way to link EX Facebook visitors with our registered EX user database to understand if registrants are visiting the Facebook fan page and vice versa. Therefore, no comparison can be made at this time between BecomeAnEX.org users who are also social media users and those who are not.

Tracking Website Utilization Trends

To examine traffic and utilization patterns to the EX site, data from March 31, 2008 until March 31, 2010 were analyzed using Stata v11. Overall unique visitors to the EX website totaled 1,481,653 during the study period, an average of 64,178 visitors per month. Of these unique visitors, 27% returned to the site more than once. Overall, visitors spent an average 6 minutes on the site and looked at an average of 7.9 pages. Approximately 227,520 visitors (over 15% of all unique visitors) registered for the Quit Plan during this time. Nearly 80% of registered users opted-in to receive e-mails and text messages from the EX program.

Traffic to the site was highly correlated with the level of television advertising, as measured by the association between weekly unique visitors and weekly GRPs (r = 0.89, p < 0.0001). Based on results from a simple linear regression, for every unit change in GRPs, there was an estimated difference of 322 unique visitors (95% CI 287.9 - 355.9, p<0.001). Figure 4, next page, depicts television GRPs and monthly unique visitors to BecomeAnEX.org for the first two years of the campaign.

Even when television advertising was not on air, traffic to the site remained relatively high. The site averaged an estimated 30,914 unique visitors per month when only online ads were running, compared to 105,025 to 110,913 when television ads were also on air. In October 2009, there was a significant increase in traffic due to television advertising that aired during the Major League Baseball series. This media promotion garnered a 116% increase in the number of unique visitors that came to the site in October as compared to the previous month. In addition, the proportion of male registered users increased by 40% compared to the overall average. This change in gender proportions (more males than females registered during this time, whereas the opposite was true for every other month during the two year period) continued into November, when EX partnered with ESPN’s “Bassmasters” program, which featured videos of top fishermen documenting their quit attempts.

Demographic and smoking characteristics of primary registered users overall and by campaign are reported in Table 2, page 17. In general, higher proportions of registered users were female, white, daily smokers in the preparation stage of change. Analysis of demographic characteristics among registered users during three phases of the
campaign (first television advertising period, online-only period, and second television advertising period) found statistically significant differences. The second television campaign saw a statistically significant increase in registrants that were male, 18-44 years old, and those with less than high school education, as compared to the first. The online-only period attracted more registered users in the preparation stage of change than the media-on phases, perhaps because this subset of people were searching organically for quit smoking help instead of a more heterogeneous group of people who may log on after seeing a television advertisement. Indeed, referral sources indicate that the online-only period saw a significantly higher proportion of people reporting they had heard about EX through a search engine than any other period.

**Figure 4:** EX Television GRPs and Monthly Unique Visitors to www.BecomeAnEX.org, April 2008 - March 2010
Table 2. Demographics and Smoking Behaviors among BecomeAnEx.org Registered Users by Campaign Period

<table>
<thead>
<tr>
<th>Gender</th>
<th>1st TV Advertising Period (March 31, 2008 – September 28, 2008) (n=93,843), % or Mean ± SE</th>
<th>Online Only Period (September 29, 2008 – September 30, 2009 (n=30,070), % or Mean ± SE</th>
<th>2nd TV Advertising Period (October 1, 2009 – February 15, 2010) (n=68,104), % or Mean ± SE</th>
<th>First Two Years (March 31, 2008 – March 31, 2010) (n=202,012), % or Mean ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>37.55 ±0.03</td>
<td>46.02 ±0.02</td>
<td>&lt;0.001</td>
<td>40.41 ±0.01</td>
</tr>
<tr>
<td>Female</td>
<td>62.45 ±0.03</td>
<td>53.98 ±0.03</td>
<td>&lt;0.001</td>
<td>59.59 ±0.01</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>83.09 %</td>
<td>83.48 %</td>
<td>&lt;0.001</td>
<td>82.82 %</td>
</tr>
<tr>
<td>Black</td>
<td>8.32 %</td>
<td>5.82 %</td>
<td>7.42 %</td>
<td>7.68 %</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>3.20 %</td>
<td>4.63 %</td>
<td>4.04 %</td>
<td>3.85 %</td>
</tr>
<tr>
<td>Asian</td>
<td>1.82 %</td>
<td>2.22 %</td>
<td>1.89 %</td>
<td>1.94 %</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>0.34 %</td>
<td>0.42 %</td>
<td>0.66 %</td>
<td>0.48 %</td>
</tr>
<tr>
<td>Native American/Alaskan Native</td>
<td>0.73 %</td>
<td>0.82 %</td>
<td>0.76 %</td>
<td>0.76 %</td>
</tr>
<tr>
<td>Other</td>
<td>2.49 %</td>
<td>2.61 %</td>
<td>2.45 %</td>
<td>2.47 %</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 and under</td>
<td>1.29 %</td>
<td>1.94 %</td>
<td>&lt;0.001</td>
<td>1.07 %</td>
</tr>
<tr>
<td>18 to 24</td>
<td>12.28 %</td>
<td>16.78 %</td>
<td>15.76 %</td>
<td>14.20 %</td>
</tr>
<tr>
<td>25-44</td>
<td>46.99 %</td>
<td>51.36 %</td>
<td>54.61 %</td>
<td>50.78 %</td>
</tr>
<tr>
<td>45-64</td>
<td>28.35 %</td>
<td>28.09 %</td>
<td>27.39 %</td>
<td>27.84 %</td>
</tr>
<tr>
<td>65 and over</td>
<td>11.08 %</td>
<td>1.83 %</td>
<td>1.76 %</td>
<td>6.10 %</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>4.34 %</td>
<td>4.79 %</td>
<td>8.93 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High School Grad or GED</td>
<td>22.61 %</td>
<td>22.58 %</td>
<td>22.40 %</td>
<td>22.60 %</td>
</tr>
<tr>
<td>Some College/Technical School</td>
<td>48.23 %</td>
<td>46.92 %</td>
<td>44.91 %</td>
<td>46.51 %</td>
</tr>
<tr>
<td>College Grad or above</td>
<td>24.82 %</td>
<td>25.71 %</td>
<td>23.76 %</td>
<td>24.36 %</td>
</tr>
<tr>
<td>Smoking Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily Smoker</td>
<td>93.14 %</td>
<td>91.97 %</td>
<td>86.48 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Some day smoker</td>
<td>3.29 %</td>
<td>3.26 %</td>
<td>8.95 %</td>
<td>5.62 %</td>
</tr>
<tr>
<td>Former smoker</td>
<td>3.57 %</td>
<td>4.78 %</td>
<td>4.57 %</td>
<td>4.30 %</td>
</tr>
<tr>
<td>Time to First Cigarette</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than or equal to 30 minutes</td>
<td>72.95 %</td>
<td>73.02 %</td>
<td>72.97 %</td>
<td>0.001</td>
</tr>
<tr>
<td>More than 30 minutes</td>
<td>27.05 %</td>
<td>26.98 %</td>
<td>27.03 %</td>
<td>26.85 %</td>
</tr>
<tr>
<td>Readiness to Quit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seriously thinking about quitting smoking in the next 30 days</td>
<td>79.33 %</td>
<td>85.82 %</td>
<td>79.88 %</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Seriously thinking about quitting smoking in the next 6 months</td>
<td>20.18 %</td>
<td>13.78 %</td>
<td>19.16 %</td>
<td>18.85 %</td>
</tr>
<tr>
<td>Not thinking of quitting smoking</td>
<td>0.49 %</td>
<td>0.40 %</td>
<td>0.95 %</td>
<td>0.64 %</td>
</tr>
<tr>
<td>Mean number of cigs/day (daily smokers)</td>
<td>17.09 ±0.03</td>
<td>16.72 ± 0.06</td>
<td>17.33 ± 0.04</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Among all registered users (primary and proxy users), self-reported referral sources to the site indicated that television was the biggest driver overall for the two year period of study (63% of all referrals). However, the proportion of registrants who reported television as their primary source of referral varied by phase. During the first television advertising period, television made up 82% of all referrals, while only 57% percent of referrals were from television during the second round of television advertising. During the online-only period, 29% of registrants still listed television advertising as their main referral source. This unexpected percentage may have resulted from a combination of recall bias and exposure to locally run EX media purchased by state NATC members when the national campaign was not on air. As anticipated, online sources, including banner ads, social networks, and search engines, were the most common referral source for the online-only period, at 40%. Online sources were the second most common way that registrants heard about EX for both periods of television advertising, the online-only period, and overall. Forty percent of visits to the site came from clicking a banner ad displayed on another website.

Approximately one-fifth, or 20.7%, of registered users viewed at least five out of the nine major components in the quit plan (see Table 3). Among registered users, 28% used the self-monitoring exercise known as the "Cigarette Tracker," 31% viewed information regarding common myths associated with smoking cessation medications, and 29% actively set a quit date within the quit plan. A very low proportion of less than 2% of users viewed all nine major component areas.

### Table 3. Completion of Quit Plan Components by Registered Users

<table>
<thead>
<tr>
<th>Number of Plan Components* Completed</th>
<th>Percent of Registered Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12%</td>
</tr>
<tr>
<td>2</td>
<td>31%</td>
</tr>
<tr>
<td>3</td>
<td>21%</td>
</tr>
<tr>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>5</td>
<td>9%</td>
</tr>
<tr>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td>7</td>
<td>3%</td>
</tr>
<tr>
<td>8</td>
<td>2%</td>
</tr>
<tr>
<td>9</td>
<td>2%</td>
</tr>
</tbody>
</table>

* Key components measured include registering, editing their profile, using the cigarette tracker, trigger separation exercises, watching videos on addiction myths, setting a quit date, visiting the support page, and completing a support exercise; however, many other components are part of the plan and could have been viewed outside of those listed in this chart.
Monitoring Social Media Activity

From February 2009, when the page was launched, through March 31, 2010, the EX page on Facebook received 31,488 page views, 1,061 “likes,” and 591 interactions (274 Wall posts, 142 comments on posts, and 175 “likes” of content). During that time, the majority of EX Facebook users were female (62%) and within the target EX age range: 30% were aged 25-34, while 26% were aged 35-44.

Assessing the Online Community

Over the 24 month period, the EX online community grew to include more than 300 “affinity” groups which were formed spontaneously by members to connect with others about their cessation experience. For example, groups include August Quit Dates, 30-Something Exes, Chantix-ers, and Mothers Who Want to Quit Smoking to name just a few. In the first two years of the campaign, over 5,000 (3%) registered users to BecomeAnEX.org uploaded a photo of themselves to their profile. There have been over 22,000 blog posts, over 195,000 wall posts, almost 3,000 forum posts with over 14,000 replies, and 348,259 comments made on the community page in the first two years.
Lessons Learned

1) Comprehensive formative research to understand the knowledge, attitudes, beliefs and behaviors of a target audience is essential to any health promotion efforts, particularly with respect to consumers at the lower socioeconomic spectrum.

2) Usability testing is a continuous, vital and necessary quality improvement component for implementing a successful site. If simple navigation proves difficult for your target audience, users may never see your content regardless of how engaging and effective it may be. Consumer-based research will help reveal whether users fully understand monikers used on the site which may not be apparent to designers and developers.

3) Media placement can be effectively tailored to drive traffic from specific segments of a target audience to a cessation website. While the overall demographic profile of registered users matched patterns observed on other websites (i.e., a skew towards females and younger users), the proportion of male users increased when specific male-focused promotion efforts were implemented.

4) Similar to other behavioral interventions, the majority of visitors and users do not take advantage of the full intervention.\textsuperscript{6,30,31} Given the increasing evidence of a dose-response relationship between duration and intensity of treatments offered via websites and successful cessation outcomes,\textsuperscript{6,32-34} the public health community needs to devote attention not only to building consumer demand, but to also increasing adherence rates for the full intervention.

5) An active online community can provide interactive and tailored social support for smokers. The numerous groups that have been organically created by members of the EX online community suggests that many smokers prefer to interact online with others with whom they share some common characteristic.

6) Since interactive digital media is constantly changing, it is critical to consult with experts in the area of social media, analytics and emerging tools — particularly as the need for more individual-level pathway data increases to answer more complex questions related to specific engagement and cessation outcomes.

7) Practitioners should consider the role of social media in enhancing a cessation website and the consumer experience. Once Facebook traffic levels started to plateau after the first year, the BecomeAnEX.org team began engaging with consumers on a daily basis and has developed a Facebook application, which introduces smokers to other members based on their smoking triggers.

8) Search engine optimization and purchasing a cost-per-acquisition online media buy are effective and cost-efficient strategies to increase conversions from visitor to registrant.
Conclusions

Data demonstrate that the EX television campaigns successfully drove significant traffic to the web-based smoking cessation intervention, www.BecomeAnEX.org. During the two television campaigns that aired nationally, a combined total of nearly 1.1 million unique visitors came to the site. While it is not surprising that the EX television advertisements produced high levels of web traffic during the two year period, it is informative to understand how traffic was maintained during the 12 months when no television media was employed. During the off-air (online-only) period, 87,892 registered users reported coming to the site from a banner ad, social network site or a search engine. Even when the television advertisements were airing, these online sources were still the second most common referral source.

Since traditional media consumption among the general population has been changing in recent years with the expansion of high speed internet service, digital video recording capabilities, social media, and smartphones, it is useful to work with media experts to reach the US online smoker population. Online advertising, including banner advertisements, a strong branded presence on social networks, and targeted advertising on search engine and social networking sites may become one of the most cost-effective mechanisms to promote web-based cessation interventions. Given the evidence of a dose-response relationship between duration and intensity of web interventions and successful quitting outcomes, further research should examine whether messaging content and/or media placement strategies can further promote the efficacy of online cessation programs.

A study to examine smoking quit rates associated with use of the EX website is currently underway. While the large reach of the site has been encouraging, it is necessary to determine the public health impact (reach and efficacy) of the intervention. Since the online context changes rapidly, it creates challenges for researchers in terms of study design and recruitment. However, it also offers the potential for new, exciting, and informative research questions. As the use of online communities and social networks continue to become incorporated into online health behavior interventions, further research is needed to explore how effective these new mediums are in producing behavior change.
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