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The Effect of the Internet on Teen and Young Adult Tobacco Use: A Literature Review

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ABSTRACT

Research has shown that a positive association exists between exposure to smoking imagery, such as that found in movies and print advertising, and the subsequent uptake of cigarette smoking. Children appear to be especially vulnerable to advertising messaging and other positive portrayals of smoking, given that most adult smokers develop the habit before age 18 years. Although many traditional types of media have been studied, the current generation of youth is growing up as digital natives, with young people increasingly using the Internet for entertainment and to obtain information. Currently the Internet is an essentially unregulated marketplace of ideas and images. However, the effect of the Internet on teen smoking

initiation has received little attention in studies. In this literature review, we summarize and critique the existing work, identify current knowledge gaps, and offer suggestions to health care providers about how to address this issue. *J Pediatr Health Care.* (2013) 27, 367-376.

KEY WORDS

Tobacco, adolescents, Internet, literature review

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Cigarettes have killed more people than any other consumer product ever made (Malone, 2010). When cigarettes are smoked as intended by the manufacturer, they kill about 50% of regular users (Doll, Peto, Boreham, & Sutherland, 2005). More than 80% of adult smokers began smoking before 18 years of age (Substance Abuse and Mental Health Services Administration, 2009). In 2009, 8.2% of U.S. middle school students and 23.9% of high school students reported current tobacco use, with rates remaining essentially unchanged since 2006 (Arrazola, Dube, Kaufman, Caraballo, & Pechacek, 2010).

Cigarettes remain fashionably displayed in most corner stores; many have large wall displays that often are located near the candy. In areas with high tobacco outlet density, young people smoke at rates 3.2% higher than those in areas without tobacco outlets, even after adjusting for confounders (Henriksen et al., 2008). Moreover, teenagers appear to be extremely susceptible to tobacco advertising and imagery. In a meta-analysis of nine longitudinal cohort studies, Cochrane Review researchers concluded that tobacco advertising and promotion increase the likelihood that adolescents will start to smoke (Lovato, Linn, Stead, & Best, 2003). Another recent longitudinal study found that high

exposure to cigarette advertisements resulted in a 1.46 adjusted relative risk increase in smoking initiation, compared with students who had low exposure (95% confidence interval [CI]: 1.08-1.97; Hanewinkel, Iensee, Sargent, & Morgenstern, 2011b).

Other studies have found that exposure to smoking imagery in media is associated with increased smoking rates, increased intent to smoke, and/or increased openness to smoking. Media appear to have an independent influence on adolescents' intent to use substances, beyond the influence of parents and peers (Scull, Kupersmidt, Parker, Elmore, & Benson, 2010; Seo, Torabi, & Weaver, 2008). A repeated measure (2000 and 2004) cross-sectional study of a representative sample of Indiana high school students (total $N = 8355$) found that an adolescent's openness to smoking was strongly associated with exposure to pro-tobacco messages (Seo et al., 2008). A cohort study of 2259 adolescents interviewed in four waves from ages 13 to nearly 17 years suggested that early exposure to popular music channels such as MTV and VH-1, which often portray smoking as part of peer culture, predicts later increases in smoking and associating with smoking peers (Slater & Hayes, 2010).

Many young people view smoking as a desirable activity associated with stress relief, "coolness," staying thin, and being either glamorous or macho and tough (Carson, Rodriguez, & Audrain-McGovern, 2005; Watson, Clarkson, Donovan, & Giles-Corti, 2003). A growing number of studies have assessed the relationship between viewing smoking imagery in movies and youth susceptibility and uptake of smoking. In 2009, 49% of the top grossing movies in the United States contained smoking imagery. Among movies oriented at youth (i.e., those rated G, PG, and PG-13), 39% contained smoking imagery, with 54% of PG-13 rated movies containing smoking imagery. As high as these numbers are, they represent a decrease over time. For example, in 2002-2003, 80% of PG-13 movies contained smoking imagery (Glantz, Titus, Mitchell, Polanksy, & Kaufman, 2010).

Multiple cross-sectional and longitudinal studies have concluded that there is a positive association between viewing smoking imagery in movies and the susceptibility and uptake of smoking, independent of other factors, with attributable risk ranging from 34% to 38% (Dalton et al., 2009; Glantz et al., 2010; Sargent et al., 2005; Sargent, Gibson, & Heatherton, 2009; Sargent et al., 2007; Song, Ling, Neilands, & Glantz, 2007; Thompson & Gunther, 2007; Titus-Ernstoff, Dalton, Adachi-Mejia, Longacre, & Beach, 2008), making it plausible to theorize that other forms of smoking imagery, such as those featured in various forms on the Internet, may have a similar association.

Although the aforementioned literature is likely to prove useful in developing questions and research strategies regarding the effect that the Internet has on

smoking uptake and normalization for youth and young adults, it is important to note that the Internet and movie watching represent different media platforms, and thus knowledge generated about one cannot necessarily be transferred to the other. The Internet is a more diverse platform with a rapidly changing amount of content, much of it user generated with no identifiable, traceable source. It also is becoming increasingly interactive, with many Web sites offering users opportunities to directly interact with the contents and other users. Web browsing frequently is done independently of other people, and an individual session can range from just a few minutes to hours. Individuals can tailor their own sessions, going to their favorite places and looking up information in which they are specifically interested. This feature also allows advertising to be specifically crafted to appeal to each user, depending on individual tastes and browsing habits.

However, although numerous studies have examined Internet use patterns for various purposes, the effect of Internet use on teen smoking initiation has received little attention in studies. In this review, we summarize and critique the existing work and identify knowledge gaps that must be addressed to develop effective interventions and policies to protect youth.

BACKGROUND

Given that tobacco can no longer be advertised on television, radio, or in print, the tobacco industry has had to turn to other innovative ways of attracting new smokers and maintaining brand allegiance. In 2008 the tobacco industry spent \$9.94 billion on cigarette advertising and promotional expenditures, including, among other avenues, Web-based activities, "viral" marketing, and insertion of their products into popular culture (Federal Trade Commission, 2011; Malone, 2010). At the same time that the tobacco industry has been actively exploiting these new media outlets, young people have started to spend more time using computers and other electronic devices. In 2009, among 8- to 18-year-olds, their total media exposure time was 10 hours and 45 minutes per day, although 29% of that time was spent multitasking, resulting in slightly more than 7.5 actual hours per day spent using media (Rideout, Foehr, & Roberts, 2010). Of that time, 1.5 hours were spent using the computer outside of schoolwork, an increase of more than an hour from 10 years ago.

Home Internet access has expanded to include 84% of all young people, and 33% have access to it in their bedrooms. When asked, 48% of young people say that they have no rules about what they are allowed to do on the computer. For persons younger than 18 years, most computer time is spent on interactive Web sites such as MySpace, Facebook, and YouTube (Rideout et al., 2010). In addition, very little regulation of speech and advertising on the Internet currently

exists, and thus an industry has multiple ways to conduct stealth-type campaigns (Liang & Mackey, 2011), providing an opportunity that the media-savvy tobacco industry likely has not ignored (Freeman & Chapman, 2008).

CHILDREN, ADOLESCENTS, AND ADVERTISING

Developmentally, children and adolescents are uniquely susceptible to the effects of advertising imagery. Research demonstrates that children younger than 7 to 8 years view advertisements and media content as trustworthy and nonbiased sources of information and cannot separate advertising from other concepts (Baiocco, D'Alessio, & Laghi, 2009). By ages 11 to 12 years, most children are aware that advertisements are attempting to sell something, but most of them still perceive the advertisements as relatively unbiased sources of information. Only 40% of 11- to 12-year-olds were able to understand that advertisements also were attempts to persuade someone to buy by using appealing techniques (Carter, Patterson, Donovan, Ewing, & Roberts, 2011).

As children move into adolescence, they become more aware of the function and purpose of advertising (Carter et al., 2011), but research suggests that it still has a powerful, normative influence on behavior (Austin, Chen, & Grube, 2006). The promotion of smoking can serve to reassure and reinforce adolescent notions about smoking's social acceptability, its value, and its relationship to the developing adolescent self-identity (Braverman & Aaro, 2004). Recent studies looking at adolescent brain development suggest that the prefrontal cortex and the limbic system, which are related to cognitive functioning and self-regulation, continue to develop well into the twenties (Lebel & Beaulieu, 2011; Padmanabhan, Geier, Ordaz, Teslovich, & Luna, 2011; Smetana, Campione-Barr, & Metzger, 2006; Van Leijenhorst et al., 2011), with interesting implications for the ability of adolescents to fully comprehend and anticipate the effects of risk-taking behavior such as smoking.

In addition, research suggests that younger adolescents look to older adolescents and social media Internet sites such as Facebook for normative behavior to emulate (Litt & Stock, 2011). Litt and Stock (2011) found that adolescents who viewed Facebook pages that portrayed alcohol use as normative reported greater willingness to use alcohol, had more positive attitudes toward alcohol, and had lower perceived vulnerability

to the consequences of drinking alcohol. In another study of more than 22,000 adolescents, the researchers found that children ages 10 to 13 years who were highly exposed to tobacco advertising had a relative risk of 1.84 (95% CI: 1.48-2.30) of becoming smokers compared with those who were not highly exposed, controlling for demographic variable and other normative influences. Older highly exposed children (ages 14 to 17 years) had a slightly smaller but still significant relative risk of 1.23 (95% CI: 1.10-1.38) of becoming smokers, again suggesting that children, through their adolescence, are susceptible to advertising and other positive media exposure when considering risk-taking behavior (Villanti, Boulay, & Juon, 2011).

SEARCH STRATEGY

On September 29, 2011, PubMed was searched for articles published in English, using the terms "tobacco industry" and "Internet." No limiting date was specified, because the Internet is a relatively new phenomenon, and this term would be self-limiting. This initial search retrieved 109 articles. A second search was done with the terms "youth," "smoking," and "Internet." This search retrieved 200 articles. In addition, snowball, citation, and related searches were completed using author names, bibliography checks, and the PubMed "related citation" function. Inclusion criteria were specified as research studies that examined the sales of tobacco products to minors via the Internet, smoking content on the Internet, youth exposure to Internet smoking content, and tobacco industry activity on the Internet. Each abstract was reviewed, and full articles were obtained for all abstracts that met inclusion criteria ($n = 20$). Table summarizes the included articles.

ACCESSIBILITY OF TOBACCO PRODUCTS TO YOUTH ONLINE

Research suggests that tobacco products are easily accessible to adolescents younger than 18 years. Although buying cigarettes online is likely not the primary source for youth acquisition (Botello-Harbaum et al., 2009), the ease with which teens can obtain tobacco opens a window into the lack of regulation of the Internet. Moreover, as the Internet continues to grow in popularity among young people and becomes part of the social fabric of their lives, acquiring tobacco products online has the potential to become more popular (Fix et al., 2006).

The first published articles investigating this phenomenon were descriptive studies of Web sites that sold tobacco products online (Hodge, Geishirt Cantrell, Struthers, & Casken, 2004; Malone & Bero, 2000; Ribisl, Kim, & Williams, 2002; Ribisl, Kim, & Williams, 2001). These studies found that cigarettes were easily available online to youth, often with no Surgeon General's warning or age verification system beyond checking a box or providing a birthday. Rarely was an adult signature required at delivery.

Developmentally, children and adolescents are uniquely susceptible to the effects of advertising imagery.

TABLE. Articles reviewed

Author (year)	n	Population	Design	Outcomes measured
Elkins et al. (2010)	163	YouTube videos	Descriptive, cross-sectional	Pro-/anti-/other tobacco video Genre Branding View count
Fix et al. (2006)	2295	9th grade students in Western New York	Repeated cross-sectional survey (2 waves)	Actual online tobacco purchases Intent to purchase online
Forsyth & Malone (2010)	128	YouTube videos	Repeated cross-sectional survey (2 waves)	Pro-/anti-/other tobacco video Genre View count
Freeman & Chapman (2010)	434	Facebook groups promoting Lucky Strikes or Dunhill	Descriptive, cross-sectional	Employee participation in Facebook fan groups
Freeman & Chapman (2009)	1	RJ Reynolds use of open source marketing	Case study	Use of Internet to market Camel Signature Blend cigarettes
Freeman & Chapman (2007)	40	YouTube videos	Descriptive cross-sectional	Pro-/anti-/other video View count Genre Cost Brands available Type of payment Anonymity of delivery Type of site Whether health warnings were present Ability to order products Appeal to young people Recall of tobacco advertising on the Internet
Hodge et al. (2004)	52	Internet vendors on tribal land	Descriptive cross-sectional	
Hong & Cody (2002)	318	Pro-tobacco Web sites	Content analysis of a random sample	
Hrywna et al. (2007)	3062	Adults in New Jersey	Repeated cross sectional study (2 waves) with random sampling	
Jensen et al. (2004)	36	Confederate minors	Cross-sectional survey	Whether the minor was able to complete an online tobacco purchase
Jenssen et al. (2009)	346	Adolescents	Longitude random sample	Exposure to tobacco imagery during Web browsing Type of imagery Location of imagery Correlation to smoking initiation No. of smoking fetish videos available Age restrictions Type of behavior depicted Type of model Amount of sexual content Smoking behavior
Kim et al. (2010)	200	YouTube smoking fetish videos	Cross-sectional descriptive study	Accessibility and appeal to minors Type of payment Presence of health warning Adult signature at delivery
Malone & Bero (2000)	141	Cigar links	Cross-sectional descriptive study	

Ribisl et al. (2002)	88	Internet cigarette Web sites	Cross-sectional descriptive study	Age warning Type of age verification Payment method Requirements for delivery Age requirement for accessing Brand name mentioned Brand image present Classification of photographs on sites Presence of nudity No. of vendors selling cigarettes online Type of payment accepted Shipping options Traffic to Web sites Success in making online tobacco purchases with credit cards or money orders Location of vendors Presence of Surgeon General warning Type of cigarettes sold Characteristics of videos Use of message board to promote/comment on Snus
Ribisl et al. (2003)	30	Yahoo! pro-smoking Web sites	Cross-sectional descriptive study	
Ribisl et al. (2011)	Varied	Tobacco vendor Web sites	Longitudinal	
Ribisl et al. (2003)	4	Confederate adolescents	Cross-sectional	
Ribisl et al. (2001)	88	Internet cigarette vendors	Cross-sectional content analysis	
Seidenberg et al. (2010) Wackowski et al. (2011)	7 1	Snus YouTube videos Web site message board	Descriptive content analysis Qualitative	
<i>Snus is a smokeless tobacco product.</i>				

Although these studies indicated that tobacco products were available online, they did not address whether youth could actually buy cigarettes successfully from online vendors. Several studies subsequently demonstrated the ease with which adolescents could buy online cigarettes (Jensen, Hickman, Landrine, & Klonoff, 2004; Ribisl, Williams, & Kim, 2003). Together these studies found that youth usually were able to easily locate Web sites that sold cigarettes, place orders, and have the orders delivered without an adult signature. However, although these studies indicate that tobacco products are readily available and that Web sites are not set up to deter youth purchases, they do not provide evidence that adolescents are actually buying cigarettes online.

Several years after these studies were published, another team of investigators attempted to quantify the proportion of adolescents who buy tobacco products online (Fix et al., 2006). In a repeated-measure cross-sectional study among 9th graders in Western New York ($N = 2295$), researchers found that in 2000-2001, 2.3% of smoking students had bought cigarettes online. By 2004-2005, 6.5% had bought cigarettes online. This study suggests that, although a minority of youth smokers buys cigarettes online, the number may be growing.

The Internet is constantly evolving, with Web sites coming in and out of existence, and thus although these early studies indicate that tobacco retailers were poised to take advantage of the Internet, they likely are not reflective of the current cyber-environment. The U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives, concerned about the loss of tax revenue and continued sales to minors, reached a voluntary agreement in 2005 with major credit card companies and FedEx and UPS to stop processing payments and delivering cigarettes to consumers (Ribisl, Williams, Gizlice, & Herring, 2011). Prior to the agreement, the number of cigarette vendors had been growing rapidly (2003: $N = 338$; 2004: $N = 775$). However, after the ban, the number seemed to stabilize and begin to drop (2005: $N = 664$; 2006: $N = 762$; 2007: $N = 497$). More importantly, a three-fold decrease in traffic to the most popular Internet cigarette vendor sites was noted (Ribisl et al., 2011).

The evidence provided by Ribisl and colleagues (2011) suggests that the Internet can be regulated and tobacco sales to adolescents can be controlled, providing an example of how the Internet can be managed to benefit public health. However, the Internet also can influence youth tobacco use in ways other than facilitating its purchase.

SMOKING IMAGERY ON THE WORLD WIDE WEB

Researching smoking imagery on the Web is a relatively new phenomenon, coinciding with the rise of the majority of Americans having online access in their homes and/or workplaces. Currently 77.3% of the population

is online ([Internet World Stats, 2010](#)), with the percentage even higher among young people ([Rideout et al., 2010](#)). The majority of studies that have been published are descriptive in nature, attempting to quantify and describe the types of tobacco content available.

The first studies about smoking imagery on the Internet examined the content of pro-tobacco Web sites ([Hong & Cody, 2002](#); [Ribisl, Lee, Henriksen, & Haladjian, 2003](#)). Like other, more traditional pro-smoking imagery, many of these Web sites portrayed smokers as young, thin, and attractive, leading exciting lives. The sites also were found to be accessible to children, and they often mentioned brands or featured brand images and displayed pictures depicting smoking, usually with female smokers. Several displayed partial or full nudity, linking sex with cigarette use. However, these studies were published before the rapid rise of the interactive Web 2.0, which greatly changed the online experience for many users. In addition, neither of the studies addressed whether the Web sites they surveyed received any traffic nor did they provide any information about demographics about the visitors to the Web sites.

[Hrywna, Delnevo, and Lewis \(2007\)](#) tried to partially address this question of exposure in a cross-sectional repeated survey of adult recall of Internet tobacco advertising. In 2001, 6.9% of adults indicated that they could recall seeing tobacco advertising online. By 2005, that number had risen to 17.8%, with the highest concentration of adult recall in men ages 18 to 24 years, Asians, and those with college educations ([Hrywna et al., 2007](#)). However, most adults recalled the advertising in the form of banner or pop-up ads, which, because technology for blocking such ads has penetrated to most users, are not as frequently used as in the past. In addition, this survey did not attempt to measure other types of online smoking imagery that may have been embedded in other, less obvious places.

More recently, researchers have begun examining online content for this type of embedded smoking imagery. Likely because of its popularity and accessibility, several studies have focused on the Web site YouTube. YouTube is an interactive video-sharing site where users can upload their own videos and receive feedback and comments. Other users can forward the videos to their friends, and the more people view each video, the higher the video is placed in YouTube's search engine. Popular videos may receive several million or more views. In February 2011, in the United States, YouTube received 1.2 billion visits, representing 122 million people. Twenty-six percent of YouTube's users were younger than 18 years ([Quantcast, 2011](#)), thus making it a rich environment in which to assess the accessibility and type of Internet smoking imagery available to adolescents.

Possibly the first research article that examined tobacco imagery on YouTube was an exploration of con-

tent. The word "smoking" was placed into YouTube's search engine, and the first 50 videos obtained were sorted by relevance, the default search mode of YouTube. The search was repeated, sorting by view count. Of those 100 videos, 40 contained smoking imagery. The videos were coded and subsequently classified by genre. The researchers found more pro-smoking videos than videos that portrayed smoking negatively. However, the anti-smoking videos had received more actual views, partly because one video had "gone viral" and had become very popular through Internet sharing ([Freeman & Chapman, 2007](#)).

In 2010, two more descriptive studies were published that investigated smoking imagery on YouTube. Both of these studies found that positive smoking imagery far outweighed anti-smoking imagery, both in view count and numbers of videos, suggesting the rapidly changing nature of the medium and the variability of results depending on search strategies ([Elkin, Thomson, & Wilson, 2010](#); [Forsyth & Malone, 2010](#)). [Forsyth and Malone \(2010\)](#) did a repeated cross-sectional survey of YouTube videos, entering the terms "cigarettes" and "smoking cigarettes" into the search engine and sorting by both relevance and view count. The same search was repeated 2 months later. In both searches, pro-tobacco videos constituted 81% of the sample. When the number of views was taken into account, pro-tobacco views made up 87% of the sample in time one and 91% in time two. The most popular videos were music videos, followed by magicians using cigarettes as props with which to do tricks, both of which are likely to appeal to young people. In addition, in the 2 months from time one to time two, the gross number of videos that the search terms retrieved increased more than 11%.

[Elkin, Thomson and Watson \(2010\)](#) used a slightly different YouTube search strategy. The researchers used the five leading non-Chinese tobacco brands as search terms and sorted by view count. The authors coded 71% of the sample as pro-smoking, 4% as anti-tobacco, and 25% as "other." Seventy-one percent of the sample contained images of cigarette brands. The genre with the largest number of videos was "archives" (old commercials), followed by clips featuring celebrities and sports figures, with the latter likely to be popular with adolescents.

A fourth recent YouTube study took yet another tack. [Kim, Paek, and Lynn \(2010\)](#) searched YouTube with the term "smoking fetish." Three months later the search was repeated. This investigation retrieved a subset of smoking videos that ties images of smoking behavior together with sex, creating powerful pro-smoking imagery ([Kim, Paek, & Lynn, 2010](#)). These researchers found that although nearly 97% of the videos explicitly portrayed smoking behaviors, 85% were not flagged as being inappropriate for persons younger than 18 years (although this flag could potentially make the videos

even more desirable to adolescents). Using the criteria that the Motion Picture Association uses to rate movies, the researchers rated 40% of the videos as PG, 32% as PG-13, and 27% as R. The study also reported that nearly 90% of the models used were female and more than 50% appeared to be young adults between the ages of 18 to 24 years.

Although these smoking fetish videos may be numerous on YouTube, they appear to appeal to a limited audience, and it is unclear who that audience is and whether it includes a large number of adolescents at risk for smoking initiation. Forsyth and Malone (2010) found that although smoking fetish videos constituted approximately 20% of their sample, they were only a little over 2% of the total view counts. Elkin et al. (2010) classified only about 4% of their sample as relating to "sex/romance."

Interactive sites such as YouTube have searchable databases with vast amounts of new content being added every day. For example, in 2011, 35 hours of content was uploaded on YouTube every minute (YouTube, 2011) thus making it an extremely fluid and flexible environment. Each of these studies of YouTube might have been made stronger if repeated measures were conducted over longer periods to assess the stability or fluidity of the phenomenon. In addition, using search terms such as "smoking fetish," "smoking cigarettes," or brand names of cigarettes are highly likely to bring up content that contains smoking imagery, as confirmed by all four of these studies. However, conducting a search using terms specifically related to smoking does not necessarily shed light on how much tobacco content the average browsing teenager who is not looking explicitly for smoking imagery is exposed to during a typical online session. Freeman and Chapman (2007) addressed this issue briefly by looking at a snapshot of the 50 most-viewed videos regardless of subject. They found that two of 50 videos, or 4% of those videos, contained smoking imagery. Whether this amount is increasing or decreasing and whether this exposure level has an impact on teen smoking rates may be a subject for further investigation. Moreover, unless a user posts a comment on the video, it appears that few if any methods currently exist to ascertain what demographic is actually watching each video.

One recent study attempted to investigate this question of how much smoking content teenagers might be exposed to on the Internet (Jenssen, Klein, Salazar, Daluga, & DiClemente, 2009). Using random digit dialing, the researchers identified 591 teens willing to have their online activity tracked for a 30-day period. Of those, 346 actually participated in the project. The final sample was skewed toward White teens who came from higher-income families. The researchers found that together the subjects viewed more than 1.2 million Web pages during the month-long observation period. Using specific tobacco-related search terms, the re-

searchers queried this data set for tobacco content. They found that 0.72% of the Web pages in their query contained tobacco content. By the end of the 30 days, 68% of the teens had viewed at least some tobacco content, and social networking sites accounted for 53% of the pages on which tobacco content was found. Interestingly, and conflicting with the findings of the YouTube studies, only 22% of the tobacco pages viewed contained pro-tobacco imagery, whereas 18% were anti-tobacco, with about 60% being either being complex, unclear, or neutral. After tracking the subjects for a year, the authors did not find a correlation between smoking initiation and number of smoking Web sites viewed, leaving open the question of the amount of impact that online smoking imagery has on the incidence and prevalence of teen smoking. Although this study is important and appears to be the only one of its type, similar studies, perhaps with larger sample sizes and more representative demographics, would certainly benefit this emerging field.

Although all of these studies indicate that tobacco content is available on the Web, only a small amount of research thus far has examined to what extent the tobacco industry is involved with creating tobacco's online presence. Although all tobacco companies had formal Web sites, they are not likely destinations for the average browsing teen, who spends the majority of his or her screen time on social networking sites (Rideout et al., 2010). However, given the vastness and relatively anonymous nature of the Internet, it is likely that plenty of opportunity exists for the tobacco industry to insert pro-tobacco imagery in other, less formal venues. Recently Freeman and Chapman (2010) published a study that explored this phenomenon. They first searched Facebook, a popular social networking Web site, with the terms "Lucky Strikes" or "Dunhill cigarettes," two British American Tobacco (BAT) brands, and found 434 groups and pages. A second search was performed to identify members of Facebook who also identified themselves as employees of BAT. These searches were cross-referenced to ascertain which BAT employees also belonged to the promotion groups/pages, and the researchers found that 3% of the promotion groups/pages also had BAT employees as fans/members (Freeman & Chapman, 2010).

In 2009, Freeman and Chapman published another study of the tobacco industry's use of online technology for brand promotion. Although this study did not examine social networking sites, it did investigate RJ Reynolds' use of the Internet's new interactive features as part of a brand promotion. In this case study, the authors explored RJ Reynolds' attempt to redesign the packaging for Camel Signature Blend Cigarettes using Internet-driven consumer input. Users were allowed to design the new packaging, including content for the brand. RJ Reynolds stated that the purpose of this

redesign using Internet-driven consumer input was to “reignite the brand” and “attract smokers—young females especially” (Freeman & Chapman, 2009). The results of this case study suggest that investigation of the tobacco industry’s use of Web 2.0 as a method for brand promotion is an important next step in tobacco control.

RJ Reynolds also used the Internet to test-market Camel Snus, a smokeless tobacco product, by creating an online discussion board (while maintaining editing rights) of Snus and potential Snus users’ experiences with the new product (Wackowski, Lewis, & Delnevo, 2011). A total of 322 unique users posted on the site and made a total of 522 comments. The Swedish Match Company also has used the Internet to market Snus, posting a total of seven videos on YouTube to promote the product. Total views for each video ranged from 1500 to 200, indicating relatively little Internet traffic (Seidenberg, Rees, & Connolly, 2010).

CONCLUSION

Clinicians in primary care, school-based clinics, and community centers should consider addressing this topic, because earlier research using rigorous study designs strongly suggests that exposure to tobacco imagery in other types of media, including movies and print sources, plays an independent and causative role in teen smoking (Dalton et al., 2009; Hanewinkel, Isensee, Sargent, & Morgenstern, 2011a; Hanewinkel et al., 2011b; Lovato et al., 2003; Titus-Ernstoff et al., 2008). It is reasonable to theorize that online smoking imagery may play a similar role. Currently, research is at the descriptive stage, and causal linkages have not been rigorously tested with longitudinal study designs. Most of these descriptive studies found that pro-smoking content was more prevalent than anti-smoking content, although this finding was not universal. Based on the research, it appears that the tobacco industry is having mixed success in directly appealing to consumers and that the majority of smoking content is viewed on “user”-generated Web pages. Preliminary data from one study suggests that teens are likely exposed but not at a high level, and increased exposure was not correlated with a greater chance of beginning to smoke. However, in this study only 47 (13.7%) of the teens studied had smoked in the past 30 days at the time of last follow-up, and thus it is unclear whether this result was due to lack of power or other factors (Jenssen et al., 2009). It also appears that

...it appears that minors can easily obtain tobacco products online, buying from Web sites that are hospitable to adolescents.

the tobacco industry has not ignored the enormous power of the Internet as a vehicle to promote its products. Moreover, it appears that minors can easily obtain tobacco products online, buying from Web sites that are hospitable to adolescents.

Because this area of research is so new, the related literature has large gaps. These gaps include studies examining the relationship between Internet exposure to tobacco content and youth uptake of smoking, including studying marginalized groups that have been historically targeted by the tobacco industry. We also do not know enough yet about how young people perceive and interact with Internet content and how their exposure to such content over time may correlate with smoking uptake. Further study of the tobacco industry’s use of the Internet, both covertly and overtly, also is an area that merits further investigation. Finally, investigating how people involved with public health and tobacco control can use new media and the Internet to craft and disseminate effective tobacco denormalization messages should be a priority. As the Internet becomes further integrated into people’s daily lives, persons interested in public health should not cede the medium to corporate interests. Although the Internet has the potential to become a tool of the tobacco industry in attracting young people to use tobacco, it also could be a powerful deterrent if tobacco control advocates learn to use it effectively to counter pro-tobacco messages.

A critical role of nurse practitioners working in primary care is knowledge about and provision of appropriate preventative services for their patients. Because tobacco use often begins during preteen years, evidence-based guidelines recommend that clinicians routinely assess and intervene with this population to ensure that they deliver tobacco prevention messages to youth and their parents during health encounters (U.S. Public Health Service, 2008). The American Academy of Pediatrics recommends that a media history be included in annual health visits. Clinicians can include a query to teens about what they have seen on the Internet regarding smoking (www.aap.org/advocacy/mmguide.pdf). Because the most effective youth smoking prevention programs have focused on industry manipulation as a core framing strategy (Farrelly, Davis, Haviland, Messeri, & Heaton, 2005; Hersey et al., 2005; Leatherdale, Sparks, & Kirsh, 2006; Sly, Heald, & Ray, 2001; Thrasher, Niederdeppe, Jackson, & Farrelly, 2006), nurses may wish to use deconstruction of marketing messages, tobacco industry internal documents (Malone, 2009), or similar approaches to help youth critique the more subtle forms of imagery and marketing messages that may be conveyed through social media Web sites and other similar content venues. Working with local tobacco control coalitions may offer other opportunities for engaging youth in working on policy initiatives to further

“immunize” them against becoming the next generation of profit fodder for an aggressive tobacco industry.

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