

The Lung Cancer and Cigarette Smoking Web page: A pilot study in telehealth promotion on the World Wide Web

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BACKGROUND: Diseases caused by tobacco products are the number one preventable health problem.

STUDY OBJECTIVES: A pilot study was performed to determine the characteristics of persons searching the World Wide Web (WWW) for information on tobacco-caused diseases, the type of information sought and the feasibility of meeting informational needs.

METHODS: The Lung Cancer and Cigarette Smoking Web Page at the unique reference location <<http://www.smokinglungs.com>>, created in January 1996, consists of hypertext metafile language files in a 'frequently asked questions' format on tobacco-caused diseases, nicotine dependence and smoking cessation. Links to other Web pages, a counter, e-mail access and Web forms were included.

SETTING: Personal computer.

PARTICIPANTS: People browsing the WWW.

RESULTS: Between April 1996 and March 1999, there were more than 150,000 hits and 1510 individual e-mail or form responses; 597 (51.3%) of the respondents were female and 566 (48.7%) were male. They ranged between nine and 79 years of age, with a median of 29 years and a mean of 34 years. The percentage of respondents 20 years old or younger was 34.3%. Five hundred thirteen people resided in 45 American states, and 195 individuals resided in 39 other nations. Students, people with tobacco-caused diseases, and relatives or friends of persons with tobacco-caused diseases

made up the large majority of correspondents. Smokers represented 40.2% of the respondents, ex-smokers 34.3% and never-smokers 25.5%. There were three main types of questions: questions for information on the diagnosis and treatment of lung cancer, for help with smoking cessation and for information on tobacco-caused diseases from students working on a school-related project. Images of tobacco-caused diseases were requested frequently.

CONCLUSIONS: An educational WWW page is a potentially important resource in the control of tobacco-caused diseases because it fosters primary prevention of smoking in young people, facilitating smoking cessation and providing information on the diagnosis and treatment of tobacco-caused diseases.

Key Words: *Cigarettes; Health education; Health promotion; Internet; Lung cancer; Nicotine dependence; Primary prevention; Smoking cessation; Tobacco; World Wide Web*

Page Web sur le cancer du poumon et la cigarette : Étude pilote de promotion de la santé sur le Web

HISTORIQUE : Les maladies causées par les produits du tabac viennent au premier rang des problèmes de santé qu'il est possible de prévenir.

OBJECTIFS DE L'ÉTUDE : Une étude pilote a été effectuée afin d'identifier les caractéristiques des personnes qui consultent le Web pour chercher des renseignements sur les maladies causées

voir page suivante

par le tabac, cerner le type de renseignements recherchés et la capacité de répondre aux besoins d'information.

MÉTHODES : Créée en janvier 1996, la page Web sur le cancer du poumon et la cigarette, à l'adresse <http://www.smokinglungs.com>, se compose de fichiers hypertextes qui répondent aux questions les plus fréquentes sur les maladies causées par le tabac, la dépendance à la nicotine et l'arrêt du tabagisme. On y a inclus des liens vers d'autres pages Web, un compteur, un accès courriel et des formules Web.

CONTEXTE : Ordinateur personnel.

PARTICIPANTS : Les gens qui furent sur le Web.

RÉSULTATS : Entre avril 1996 et mars 1999, plus de 150 000 contacts ont été établis et 1 510 personnes ont adressé un courriel ou répondu au moyen des formules fournies. Cinq cent quatre-vingt-dix-sept répondants (51,3 %) étaient de sexe féminin et 566 (48,7 %) étaient de sexe masculin. Ils étaient âgés de 9 à 79 ans, la médiane se situant à 29 ans et la moyenne à 34 ans. Le pourcentage des répondants de 20 ans ou moins était de 34,3 %. Cinq cent

treize personnes résidaient dans 45 états américains et 195 résidaient dans 39 autres pays. Les étudiants, les patients atteints de maladies causées par le tabac et les proches ou amis de personnes atteintes de maladies causées par le tabac composaient la grande majorité des correspondants. Les fumeurs représentaient 40,2 % des répondants, les ex-fumeurs, 34,3 % et les personnes n'ayant jamais fumé, 25,5 %. On a relevé trois principaux types de questions : les demandes d'information sur le diagnostic et le traitement du cancer du poumon, les demandes d'aide pour l'abandon du tabagisme et les demandes de renseignements sur les maladies causées par le tabac provenant d'étudiants dans le cadre de travaux scolaires. On a souvent demandé des illustrations des maladies causées par le tabac.

CONCLUSION : Une page d'information sur le Web peut constituer une ressource importante pour la lutte anti-tabac, parce qu'elle favorise la prévention primaire du tabagisme chez les jeunes, contribue à l'abandon de la cigarette et offre des renseignements sur le diagnostic et le traitement des maladies causées par le tabac.

In January 1996, the author, a thoracic surgeon, initiated a pilot study into the feasibility of providing information on tobacco-caused diseases using a World Wide Web (WWW) page. The aims of the present study were to determine who was searching the WWW for information on smoking, smoking cessation (SC), lung cancer and other tobacco-caused diseases; to determine their characteristics and the type of information they sought; and to explore the feasibility of meeting their informational needs satisfactorily in a WWW page format.

METHODS

WWW pages with content on cigarette smoking, smoking, lung cancer and other tobacco-caused diseases were identified in Web searches, and were indexed for type of content. A WWW page was then created using hypertext markup language (HTML) and was entitled the Lung Cancer and Cigarette Smoking Web Page (LCCSWP), found at the unique reference location (URL) <http://Ourworld.compuserve.com/HomePages/LungCancer>.

A brief introduction followed by a series of informational pages in a 'frequently asked questions' format contained multiple questions on tobacco-caused diseases topics. A brief answer, based on best available data, was supplemented by links to pertinent WWW pages identified during the search process, offering rapid access to collateral information, images, references and divergent opinion. The content was updated periodically, and new references and links were added. No commercial service was used to advertise the existence of the Web page. Links were swapped with other tobacco-control and medical Web sites.

Visitors were invited to submit questions or comments by e-mail. A Web counter was installed in April 1996 and a Web form was installed in July 1996. This brief questionnaire requested information on demographics, education, profession and smoking status, how the visitor had found the page and the type of information sought. (The form used to collect information on this Web page is located at the

URL <http://www.smokinglungs.com/webformc.htm>.) All e-mail and form responses between April 30, 1996 and March 30, 1999 were archived. Each message was acknowledged, and an attempt was made to answer the questions posed or to provide the information requested. Cutting and pasting information from document files using a word processor facilitated this process.

A new, improved and updated version of the LCCSWP designed by Stephen Teel, a Web developer who has received treatment for two tobacco-caused diseases (oral and lung cancers) (1), is now maintained at the URL <http://www.smokinglungs.com>. A deliberate attempt was made to avoid large graphics and animation files that would slow access to browsers with low bandwidth systems.

The cost of maintaining the 5 MB Web page was limited to \$20/month. The time needed for the author to update and reply to mail typically amounted to 5 to 10 h/week. Encryption of messages was not used. Strict confidentiality of correspondent information was maintained.

Activity on the Web site was monitored for a one-week period in February 2000 using WebTrends software (WebTrends Corporation, USA) based on server log files.

RESULTS

Within three days of posting the Web page, e-mail was received. By the end of the first year, there had been more than 20,000 'hits', increasing to more than 150,000 in the three-year period between April 1996 and March 1999. The one-week server log documented 685 unique visitors to the site, 1925 visitor sessions and 5746 hits (ratio of individuals to hits of 1:8.3). During this week, 464 people visited the site only once and 221 people visited more than once; 56 (8%) visited more than 10 times. During 74% of the visitor sessions, only one page was accessed, while two to 12 pages were accessed in 26% of sessions. Sixty-eight per cent of visitor sessions lasted less than 1 min. Thirty-two per cent of visitors remained at the site for between one and 19 min. Peak activity occurred during early evening hours.

TABLE 1
Age of people seeking tobacco-caused diseases information at the Lung Cancer and Cigarette Smoking Web page

| Age (years) | Number | Percentage |
|-------------|--------|------------|
| 9-20 | 241 | 34% |
| 21-30 | 132 | 19% |
| 31-40 | 149 | 21% |
| 41-50 | 109 | 15% |
| 51-60 | 61 | 9% |
| 61-70 | 12 | 2% |
| 71-79 | 7 | 1% |
| Total | 702 | 100% |

The information from 1510 people who returned e-mail or form responses was tabulated. Further messages were exchanged in 363 instances. There were 597 (51.3%) female respondents and 566 (48.7%) male respondents (n=1163). Seven hundred two correspondents provided their age. Age ranged from nine to 79 years (median 29 years) (Table 1). Seven hundred eight correspondents provided a home address; 513 of these were located in 45 American states. The number of visitors corresponded roughly with each state's population. There were 195 people from 39 other nations. Most international responses were from English-speaking nations; Canada (n=65), Australia (n=29) and the United Kingdom (n=18) headed the list – no other country exceeded six responses. On server log analysis, 2.5% of visitor sessions originated from international sites.

Students, people with tobacco-caused diseases and their relatives or friends constituted the majority of correspondents. A smaller number identified their professions, including physicians (n=25) and nurses (n=13). Smoking status was identifiable in 513 responses (Table 2). Sixty people were smokers in the process of SC. At present, 50 to 60 e-mail messages and forms are received each month.

The major areas of interest were tabulated (Table 3). Although the overwhelming majority of responses were positive, there were a small number of critical or hostile responses (n=22, 1.5%) and identifiable prank responses (n=9, 0.6%). Eight people sought help in finding a lawyer to sue a tobacco company.

Fifty-three different sources of access or referral to the LCCSWP were identified in 151 form responses. Small numbers were referred by links from other Web pages, support groups, friends, teachers and relatives. By WebTrends analysis, America Online accounted for 38% of visitor sessions.

During the single-week server log, visitors downloaded 4403 files totalling 34,150 KB – 1052 HTML files and 2912 graphic files.

DISCUSSION

Although there are very many excellent existing Web sites with content on smoking, SC and tobacco-caused diseases, there is very little published information on the char-

TABLE 2
Smoking status of people seeking tobacco-caused diseases information at the Lung Cancer and Cigarette Smoking Web page

| Smoking status | Responses (n) | Percentage |
|----------------|---------------|------------|
| Smoker | 206 | 40 |
| Ex-smoker | 176 | 34 |
| Never-smoker | 131 | 25 |
| Total | 513 | 100 |

TABLE 3
Topics of requests for information to the Lung Cancer and Cigarette Smoking Web page

| Subject | Responses (n) | Percentage |
|-------------------------------------|---------------|------------|
| Relative or friend with lung cancer | 373 | 30 |
| Patient with lung cancer | 55 | 4 |
| School project | 324 | 26 |
| Request for pictures | 74 | 6 |
| Smoking cessation information | 248 | 20 |
| Help another in smoking cessation | 48 | 4 |
| Link swap from other Web pages | 48 | 4 |
| Cancer risk | 32 | 3 |
| Tobacco control | 30 | 2 |
| Environmental tobacco smoke | 22 | 2 |
| Total | 1254 | 100 |

acteristics of people seeking this information and the feasibility of meeting their requests for information (2,3).

Information from the hit counter and server log allow for an estimate that more than 18,000 people visited the LCCSWP (150,000 hits, 8.3 hits/individual) over the three-year study period. The number of e-mail and form responses (n=1510) was relatively small, representing approximately 1% of hits or 8% of people. Because of this low response rate, the percentages derived from the responses may not accurately reflect the characteristics of the total population of visitors.

Although one may expect more WWW browsing activity from male individuals, female individuals provided more responses. The preponderance of young people (median age 29 years) was expected, but the number of school-aged children, adolescents and young adults (roughly one-third) seeking information on tobacco-caused diseases was somewhat surprising.

There was no identifiable disparity of responses by American state population. The large number of international correspondents was an unexpected finding. The preponderance of international responses from English-speaking nations suggests that Web pages offering health promotional information should offer content with multiple language options to increase international dissemination of information.

This study did not provide meaningful information on how people reached the LCCSWP, except to suggest that the pattern is very complex.

There were three main categories of requests for information. First, many people sought information on the diagnosis and treatment of lung cancer or other tobacco-caused diseases, usually because of their own current illness, or that of a friend or a relative. Second, many people sought help and information on SC, including people in the process of SC and people seeking to assist others with SC. Third, and perhaps most intriguing, there were many requests from young people for information on tobacco-caused diseases. These requests were typically from students working on a school-related project. Many people requested graphic images of lung cancer and other tobacco-caused diseases. They expressed the opinion that such images would be valuable in primary prevention and SC.

In the process of replying to these requests for help or information, certain facts became evident. First, it is very difficult to try to provide comprehensive advice regarding the management of individual cases of lung cancer and other tobacco-caused diseases. The inability to access full information on a case makes it difficult to provide more than general information. Even general information, however, is often gratefully acknowledged as helpful. A careful disclaimer statement was included to emphasize that it is impossible to give accurate personal medical advice from a distance, and that any information found in page files or e-mail must be put into context by discussion with a personal physician.

Second, of potential importance is the fact that substantial numbers of people contemplating SC or in active SC attempts are seeking information on the WWW. Solicited SC advice was given by the author in the form of personal e-mail and referral to other Internet sources. There are a number of innovative Web pages that provide on-line help to a smoker who wants to quit smoking. The response to personalized SC information and advice was generally very positive, and many people reported that they were trying to quit because of what they had read on Web pages or in personal e-mail messages. This permits us to speculate that it may be possible to provide the elements of successful SC intervention using WWW technology. Previous studies on SC have used delivery of SC components through direct, personal contact with the patient, although follow-up was completed by mail or telephone in some cases. The new computer-based technology available on the WWW should allow for provision of most components of a successful SC clinic without physical proximity to the patient.

Finally, the documentation that young people are seeking information on the health risks of cigarette smoking and other types of tobacco use on the WWW opens a window of opportunity to provide such information to them in an exciting medium at low cost.

Tobacco-caused diseases are the number one preventable public health problem. Despite clear consensus statements on the dangers, more than 50 million North Americans continue to smoke. Nicotine dependence and tobacco-caused diseases are unusual disease entities, in that the etiological vector is not

an insensate physical force or micro-organism, but rather a large and powerful industry. The tobacco industry spends more than \$8 billion in the United States annually to market the use of tobacco products known to cause human disease and to encourage young people to initiate smoking. The amount of money spent by public and private agencies on health promotion and antitobacco advertising pales in comparison. The net effect is that young people are strongly influenced to smoke through such marketing, independent of other known factors, including peer modelling (4). It is now estimated that as many as one-third of beginning smokers start smoking under the influence of tobacco advertisements (5). It is especially worrisome that children are beginning to smoke earlier in childhood, because it is known that early initiation results in a higher incidence of addiction (6,7), higher consumption of cigarettes later in life and a higher risk of DNA adduct levels than the initiation of smoking later in adolescence (8).

Successful tobacco industry marketing strategies and techniques have been adopted and exploited by tobacco control groups in counter-advertising campaigns that have proved successful in lowering youth smoking rates (4). Focus groups of young people have identified the characteristics of effective billboard and TV advertisements; also, and of special note, advertisements reporting tobacco industry manipulateness and issues concerning secondhand smoking are specifically effective (9). Unfortunately, such mass advertising is expensive and subject to indirect control by the tobacco industry through their political allies (10,11).

The WWW is a revolutionary method of interpersonal communication that is currently undergoing explosive global growth, which opens up exciting new possibilities in the promotion of healthy behaviour. Large text, graphic and audiovisual files can be stored and transmitted at a small fraction of the cost of conventional media. Access to the WWW is available to a large and growing percentage of people. Although there are at least 2.95 million personal computers in the Los Angeles, California area, the ratio of multimedia computers to students is poor (1:73) in California schools (12). It is known that as many as half of the people surfing the Internet seek health-related information (13,14). Although there is a disparity of access according to income, public access to the WWW through libraries and schools is rapidly improving. It is probable that all school children in the United States and Canada will have access to the WWW within the next decade through various Internet initiatives (15,16).

Accordingly, the WWW offers an exciting new media technology that can be used to provide health promotional information on tobacco-caused diseases and to counter the adverse effects of tobacco industry marketing. Information in WWW pages crosses international borders without impediment, which is an important consideration because the tobacco industry is actively disseminating the disease vector worldwide (17).

While the education of children regarding the health hazards of tobacco use has always been a high priority, its effects have been disappointing. Our society is currently losing the

battle against use of tobacco products, because recent statistics show that the number of high school-aged smokers and users of 'spit' (or chewing) tobacco is still increasing in many areas. The most important change that needs to be made is to develop effective strategies to stop young people from initiating the smoking habit. A WWW-based repository of information on the hazards of smoking, spit tobacco, nicotine addiction and adverse health consequences may supplement currently available educational resources. Based on the experience with the LCCSWP, many young people are involved in school projects and reports involving smoking and spit tobacco. Age-specific, Internet-based resource centres may become an easily accessible, user-friendly educational and health promotional resource that could rapidly disseminate new research information on smoking, spit tobacco and their related health hazards to children, adolescents and young adults. Text files would have to be specifically designed for ease of reading and understanding by a young person of a specific age or reading level. The fact that this information would be used in classroom presentations to students by students may multiply its health promotional effect.

Unfortunately, the majority of information on tobacco-caused diseases available on the WWW is not suitable for young people, but numerous new Web pages designed for and by young people are now fast appearing. The author has created a Web page entitled the Young People's Cyber Library at the URL <<http://www.smokinglungs.com/cyberlib.htm>>, which offers links to multiple Web pages containing content specifically designed for young people. In a recent week, there were 74 visitor sessions at the Young People's Cyber Library, lasting an average of 4 min 34 s.

The value of the WWW in primary prevention and SC in young people must be investigated. The participation of teens and young adults is important to ensure that WWW pages intended for this age group have contemporary appeal to young readers. The striking success of the "The Whole Truth" Web page, designed by the young people of the Florida Kids Campaign Against Tobacco, is instructive in this regard (18).

It is also of considerable interest that many young people believe that graphic images of tobacco-caused diseases are effective in primary prevention and in SC. A 'scared straight' strategy has been used in primary prevention of 'driving while intoxicated', as well as in drug and crime prevention programs, but has not been extensively investigated in the primary prevention of tobacco use and SC in young people. The author is currently working on a cyber gallery of images of tobacco-caused diseases to answer requests for graphic images.

Problems: 'Link rot' is the major problem in the maintenance of an educational Web page. Unlike a book or journal article, which maintains its 'address' indefinitely, managers of Web pages often change URL addresses, and links to these pages become inoperative. Although links provide a quick source of reference to collateral materials, they are short-lived, and unless they are frequently updated at considerable effort, they can result in frustration and dissatis-

faction. Replies to e-mail are sometimes undeliverable, resulting in loss of time and efficiency in e-mail replies. Prank or hostile e-mail is a minimal problem.

CONCLUSIONS

Large numbers of people are browsing the WWW for information on tobacco-caused diseases. Health promotional Web pages on tobacco-caused diseases should include information suitable for young readers, including graphic images. Future research efforts with SC interventions in a Web page setting are needed.

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