

EXAMINING THE QUALITY OF SMOKING CESSATION
INTERVENTIONS AVAILABLE THROUGH THE INTERNET

by

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Abstract

Background: The Internet promises to be an effective vehicle for widespread delivery of Web-assisted tobacco use cessation interventions. Little is known regarding the quality of information available or the usefulness of search tools, such as gateways, in enabling consumers access to accurate and credible cessation information. The purpose of the study was to describe the quality of online tobacco use cessation information available through the World Wide Web (WWW), to compare content of websites retrieved through different search tools, and determine the relationship between standard criteria and evidence-based criteria for smoking cessation interventions available through the Internet.

Methods: Web sites purporting to provide self-help smoking cessation information were identified using three search tools; 1) search engine (google.com), 2) private gateway (allhealthnet.com), and 3) public gateway (canadian-health-network.ca, healthfinder.gov). Two independent reviewers rated sites using a 34-item checklist, designed to measure the presence of standard criteria for health information and evidence-based information for treating tobacco use; web site scores were calculated to judge quality of information and conduct analyses. All sites were selected and reviewed between February and April, 2004.

Results: 120 sites were evaluated; the mean total quality score was 0.57 (range = 0.09 to 0.92). Mean total scores differed significantly between search tools ($p = 0.02$); post-hoc comparisons (Bonferonni correction) did not detect a difference in total quality scores between the three search tools. Linear regression analysis demonstrated that evidence-based score was a significant ($p < 0.1$) predictor of standard score, with a coefficient of determination of 0.26.

Discussion: The type and content of tobacco use cessation information available is extremely variable, and is not dependent on the search tool used to access the web site.

Findings question the utility and effectiveness of standard criteria to measure informational content, and highlight the importance of research into the effectiveness of Web-assisted tobacco use cessation interventions, and developing policies to guide consumers to useful information.

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Acknowledgements

Upon completing my Bachelor of Science, I reflected on the words of Dr. Seuss:

*You have brains in your head.
You have feet in your shoes.
You can steer yourself in
Any direction you choose.
You're on your own. And you know what you know.
And YOU are the guy who'll decide where to go.*

I do decide where I go, but I'm not alone in getting there; there have been many along my path through graduate school who helped me get to where I am...

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*Where is the life we have lost in living?
Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?*
T.S. Eliot

Chapter 1 - Introduction

1.1 Problem Definition

Tobacco use is a public health problem of epidemic proportion. Worldwide, approximately 1.1 billion smoke, and prevalence of tobacco use is increasing (1). Approximately half of all long-term smokers will die from causes related to tobacco use. In North America, despite a decrease in prevalence, tobacco use is the leading cause of death and disease. Worldwide the number of tobacco deaths is increasing and in Canada, where approximately 5.4 million adults are current smokers (2), cigarette smoking remains the number one preventable cause of death, contributing to approximately 50,000 premature deaths annually (3).

During the next century, it is estimated that one billion tobacco-related deaths will occur worldwide unless sustained action is taken now (4). Actions to reduce tobacco use include a mix of policy, prevention, protection, and cessation strategies. Each of these strategies will contribute to the overall reduction in tobacco-related morbidity and mortality; however, it is by treating tobacco dependence where significant gains will be made at the population level. By increasing the utilization and effectiveness of interventions for current smokers the projected number of tobacco-related deaths may be reduced by 60% over the next 50 years (5). The challenge is to disseminate widely-accepted, low cost, and effective interventions to motivate and treat the greatest number of smokers (6).

The Internet, a worldwide communications network, promises to have a profound impact on health and the delivery of health care information. In particular, tobacco use cessation interventions delivered through the Internet have the potential to reach, motivate

and treat a large population of smokers. Worldwide, almost 730 million people are online, accessing the Internet in 33 different languages (7). In North America, searching for online health information is one of the most popular activities online. In Canada, two thirds (66%) of users have visited a health web site, (8) and in the US, 80% of American Internet users have searched for information on at least one major health topic, with 6% seeking information on how to quit smoking (9).

Preliminary evaluations of online cessation interventions are suggestive of an effective treatment tool, despite small sample sizes and lack of control participants. In a small pilot study of an Internet cessation program, 78% of respondents indicated that the web site increased their intention to quit and 94% felt that the site aided their quit attempt (10). In another study of the design and evaluation of an Internet-based smoking cessation program, using an intention to treat analysis, 18% of users remained abstinent from smoking at a three month follow-up (11). In Japan, 52% of smokers and 43% of heavy smokers quit smoking 12 months after enrolling in an online smoking cessation program (12) and Woodruff and colleagues (13) reported significant changes, from baseline, in quitting, amount smoked, and intentions to quit after participants completed a web-based support program.

Despite the advantages of providing online health and smoking cessation information, users face the concurrent challenges of finding suitable information and determining information quality. The quantity of information available through the Internet is overwhelming, and navigation increasingly complicated. In less than two years the number of available documents on Google alone increased from three billion to over four billion (14). The quality of health information available is also a cause for concern. In a review of 79 studies examining the quality of health information on a variety of topics, 70% of studies concluded that quality is a problem (15). No controls exist for monitoring information on the

Internet, and users risk accessing misleading, inaccurate and possibly harmful information (16). In addition to the vast quantities of information and navigational difficulties, consumers are at risk of accessing poor quality information. No controls exist for monitoring of information on the Internet, and misleading, inaccurate and possibly harmful information is prevalent.

Widespread use of the Internet for health information and concern over access to and the quality of information has led to efforts to assess and enhance online health information. Various quality criteria have been proposed and initiatives, such as health information gateways, have been developed to help users find information and to determine its quality. Such criteria have been assumed to reflect web site quality; however, few have investigated their validity as indicators of scientific quality (17), and measures are used inconsistently. In addition, few studies have evaluated the utility of health information gateways to guide consumers to accurate and evidence-based content on the Web.

The quality of online tobacco use cessation interventions is variable; one study found the majority of web sites contained information congruent with the US Department of Health and Human Services recommendations for treating tobacco dependence (18), whereas Bock and colleagues reported that 80% of sites provided no coverage of one or more of the main elements (19). Although both studies present apparently conflicting results, both authors concluded that smokers may have trouble distinguishing among quality sites when seeking tobacco dependence treatment through the Internet. Health information gateways have the potential to provide users with easily accessible and trustworthy information; however, no previous research has compared the quality of tobacco use cessation sites accessed via search engines and health information gateways.

1.2 Study Purpose

The purpose of this study was to measure the quality of tobacco use cessation interventions through the World Wide Web (WWW), and to compare the search efficiency and the quality of the information available between three different search tools. The aim of the research was to address gaps in knowledge related to both the quality of information available, and the utility of gateways in enabling consumers access to accurate and useful web sites.

1.2.1 Research Objectives

The specific objectives of this study were to:

- describe the quality of online tobacco use cessation information available on the World Wide Web using standard criteria for evaluating health information web sites and evidence-based criteria for effective smoking cessation programs;
- compare the quality of information on web sites retrieved through different search tools, including general search engines, privately administered gateways, and publicly-administered gateways;
- determine the relationship between standard criteria and evidence-based criteria for smoking cessation interventions available through the World Wide Web.

1.3 The Following Sections

Chapter 2 describes the importance of delivering effective tobacco use cessation interventions, the potential of the Internet, and reviews the published literature related to web-assisted tobacco cessation and the quality of health information online. Chapter 3 contains the methodological details of the study, including a description of data collection procedures,

evaluation measures, and statistical analyses. Chapter 4 presents the study results, and Chapter 5 discusses the implications and limitations of the study, and provides recommendations for further research and practice.

Chapter 2 - Review of the Literature

2.1 Introduction

Tobacco use remains the leading cause of preventable death and disability in Canada; in 1998, 22% of all deaths were attributable to smoking (3). The most significant reductions in morbidity and mortality will be achieved through effective treatment of tobacco dependence. Rather than refining existing approaches, it is essential that a larger proportion of smokers be motivated to make quit attempts. Innovative delivery systems, such as the Internet, have the potential to reach and support a large population of smokers in their attempts to quit smoking.

This chapter describes the importance of delivering effective tobacco use cessation interventions, the potential of the Internet in delivering such interventions, and reviews the relevant literature related to web-assisted tobacco cessation and the quality of health information available online.

2.1.1 Tobacco Control: A Comprehensive Approach

No single process is sufficient to address the problem of the tobacco epidemic; instead a variety of approaches is required. Effective tobacco control requires a diverse and coordinated array of strategies including research, policy, and programmatic components (20). In Canada, a strategy was introduced in 2001 to further reduce the impact of tobacco use. The Federal Tobacco Control Strategy is a comprehensive, integrated, and multi-faceted approach, and aims to significantly reduce death and disease due to tobacco use.

The Canadian strategy builds upon previous tobacco control activities and directions by combining four synergistic components including protection, prevention, cessation, and harm reduction. In addition, mass media and public education campaigns strengthen and support specific components (21). Protection strategies create physical, legal and regulatory environments that support non-smoking as the cultural norm. Prevention programs discourage people from taking up smoking, and cessation efforts provide access and resources to help people stop using tobacco. The principle of harm reduction recognizes that some will continue to smoke, and therefore, aims to reduce the health hazards of tobacco products to the greatest extent possible.

Despite the importance of a comprehensive tobacco control effort, public health benefits will be realised most immediately by helping current tobacco users to quit or reduce their use. For the individual who stops using tobacco, risk reduction of all major forms of tobacco-caused disease and increased life expectancy occur almost immediately. All smokers are able to reduce their risk of disease upon quitting; those who stop smoking by the age of 30 decrease their risk of lung cancer attributable to tobacco by 90% (22). At the population level, reducing current smoking prevalence by 50% would prevent 20-30 million premature deaths worldwide by 2025 (23).

2.1.2 Treating Tobacco Use

Most smokers would like to quit. Approximately 70% of American smokers are interested in quitting (24) and in Canada in 2001, 54% of smokers were either contemplating quitting within the next six months (38%) or preparing to quit in the very near future (16%) (25). As part of a comprehensive strategy for tobacco control, widely disseminated, low cost and effective interventions are necessary to motivate and treat a large number of smokers

(6;26). Several methods, including intensive behavioural interventions such as group and individual therapy (27), have been shown to effectively treat tobacco dependence; however, such strategies are relatively expensive and lack the capacity to treat a large population of smokers.

Self-help interventions for treating tobacco use are an important tool and have the potential to engage a large proportion of the smoking population. They aim to provide some of the benefits of intensive behavioural interventions, yet may be widely disseminated and do not require users to attend treatment sessions. Self-help interventions may offer state of the art, cognitive-behavioural treatment through a variety of channels anonymously, and at minimal cost (28). Additionally, using technologies available, self-help interventions may be tailored to individual characteristics and needs. Although evidence for the effectiveness of self-help materials is limited, individually tailored materials were more likely to assist quitting than standard or stage based materials (OR 1.36) (29).

Despite the minimal effectiveness of self-help interventions compared to more intensive interventions, self-help programs have the potential to achieve a greater population impact. The impact of a smoking cessation intervention is the product of a program's efficacy and reach (penetration into a given population) (26). Intensive, clinical interventions often result in a high abstinence rate; however, such programs have low participation, resulting in minimal impact. In contrast, population-based interventions have greater participation rates yet result in lower abstinence rates. The health impact will be greatest when smoking cessation interventions are disseminated at a population level, despite a lower efficacy. Public health interventions, such as self-help programs, reach more of the population, and thus create the potential to motivate a larger proportion of smokers.

Glynn and his colleagues suggested that smoking prevalence will not be reduced by refining existing approaches for smokers who actively seek treatment, rather gains will be made by motivating more smokers to make quit attempts and by making cessation materials readily available (30). Theoretically, programs delivered through the Internet are able to motivate and treat smokers using state-of-the-art, customized programs, and may reach an enormous proportion of the population. More importantly, the World Wide Web (WWW) appears to be attractive to smokers; the QuitNet (www.quitnet.com) program alone attracts over 100,000 users per year without direct marketing (31). Delivering self-help interventions and cessation information through the Internet may prove to have a significant impact on the health of the population.

2.2 *The Internet*

The Internet offers high-speed communication and information resources to millions. As access to and use of the Internet increase, the technology promises to have a profound impact on human behaviour.

The Internet is a global system of computer networks connecting users around the world. It consists of a set of computers, physical (or wireless) links between computers, and a set of rules governing information exchange between computers. The Internet offers high-speed communication and information resources to millions worldwide, and is said to be the most important development in global communication since the introduction of the television and telephone, influencing both social and business practices (32).

The Internet (or ARPANET) was conceived in 1969 by the Advanced Research Projects Agency (ARPA) of the U.S. government to create a network enabling computers at different locations to "talk to" one another. Communication across the ARPANET was

extremely restricted, and mainly reserved for university and military personnel. Messages delivered through the ARPANET could be routed or rerouted in more than one direction, thus if parts of the network were destroyed in a military attack or other disaster, the whole system would continue to function properly. The Internet was released publicly in 1991 and today is a global, public, cooperative, and self-sustaining facility that enables services such as, the World Wide Web, electronic mail, File Transfer Protocol (FTP), Telnet, and instant messaging.

2.2.1 The World Wide Web

The WWW is a worldwide collection of text, multimedia files and other network services interconnected via a system of hypertext links. It is the largest, and one of the most popular components of the Internet, providing a user-friendly interface to the technology. The Web allows for rich and diverse communication by displaying text, graphics, animation, photos, sound, and video. Physically, the web is composed of the user's personal computer, Web browser software, a connection to an Internet service provider, servers that host web sites and other digital data, and routers and switches to direct the flow of information (33).

2.2.1.1 How the Web Works

The WWW is a client/server system; the client communicates with the server to provide information to the user. The client, or web browser, is the interface between the user and the network aiding in navigation and display of information. A web server is a computer that stores and handles requests for data, e-mail, file transfers, and other network services from other computers. When a request is made by the user, the browser contacts and sends a

message to the server. The server then locates and sends the appropriate information to the browser which displays the results to the user.

Much of the information available through the web is stored as a web page, an electronic document created in the computer language, Hypertext Markup Language (HTML). Each web page has a unique address, called a Uniform Resource Locator (URL) that identifies its location on the network. Collectively, a group of related pages is called a web site. HTML contains commands that tell the browser how to display information (i.e. text, graphics, or video) and commands for linking pages to other Internet resources.

2.2.1.2 Navigating the World Wide Web

The WWW provides access to billions of documents in several languages. Unlike traditional collections of information (i.e. physical libraries), the Web is not catalogued in any particular order or vocabulary. There is no way to search the entire Web; however, several search tools are available and provide a gateway to Web content. Search tools help users navigate the Web by creating an index of web sites according to keywords and link popularity. The search tool provides the user with hypertext links and URLs to relevant pages, and thus the ability to retrieve text, images, sound and more.

Search tools vary according to how they index information and the type of information indexed. Generally, search engines (i.e. Google.com) automatically scour the WWW for sites of relevance, whereas directories or gateways (i.e. dir.yahoo.com) are compiled and reviewed by human authors. Users are then able to browse categories of information, rather than searching for keywords.

2.2.2 Internet Use

In September 2002, it was estimated that 606 million persons were using the Internet worldwide (34). A survey of Internet usage in North America indicated that 71% of Canadian and 68% of American adults were online in 2003 (35). Other data suggest that the growth of the Internet in North America has reached a plateau. In Canada, the number of new users expanded by only 4% in 2002, compared to an increase of 19% in 2001 and 24% in 2000 (36). Despite signs that growth of new users has slowed, there has been a sizeable increase in the intensity of usage among those already online (37). Users who reported daily or almost daily use increased sharply from 54% in 2001 to 65% in 2002 (37) and in the August 2003, 52% of American users reported they go online in a typical day (38).

2.2.2.1 The Digital Divide

Despite a high prevalence of use in North America, differences in access and usage patterns persist across population groups. In fact, Internet users and non-users continue to vary by age, education, and income level. Non-users are more likely to be older individuals, have less education and a lower household income than Internet users (38;39). Internet use declines significantly with age; 90% of Canadian teens 15- to 19- years reported Internet use compared to only 13% of Canadians aged 65 to 69 years (39). Additionally, households with children living at home tend to have greater access to the Internet (40). During the early years of the public Internet, users were more likely to be men; today this gap is narrowing. In the United States, 51% of the Internet population was female in 2003; however, men were more likely than women to access the Internet daily (65% of men were online compared to 61% of women) (38).

Similar divisions exist regarding the population of Canadians who smoke compared to those who don't, and warrant consideration when examining access and availability to Internet-based tobacco use cessation information. Prevalence of smoking among adults over the age of 15 years is inversely related to income adequacy; according to the National Population Health Survey, there are almost twice as many current smokers at the lowest income adequacy group as there were in the highest (38% vs. 21% respectively). Similar patterns exist when examining education levels; 33% of those with less than a secondary school education were current smokers compared to 23% of those with a college or university education (41)

2.2.2.2 Barriers to Access

In Canada, non users reported lack of interest, lack of need, and cost as their main barriers to access and Internet use. Barriers vary demographically; younger consumers are more likely to indicate that cost is an obstacle whereas older consumers show a lack of interest (37). Non-users with the lowest incomes were more likely to report cost as a barrier to their Internet use; of those with less than \$20,000 household income, 42% reported cost as a barrier, compared to 35% of non users living in a household with an income level of \$20,000 to \$40,000 (39). Conversely, for non-users who have a household income greater than \$50,000, lack of time was the major barrier to Internet use (39).

2.2.2.3 Searching for Health Information

Both Canadian and American Internet users search online to find information. In a recent survey conducted by comScore Networks, 85% of Canadians and 73% of American Internet users conducted at least one search in the month preceding the survey, and performed

an average of 40 and 35 searches per month, respectively (42). Increasingly, users are accessing the Internet to find health information. Almost two-thirds (64%) of regular users from home had at least one member of their household who used the Internet to search for medical or health related information in 2002, up from 43% in 1998 (40). More Canadians seek online health information, than use the Internet to send joke emails (59%) or instant messages (54%), conduct online banking (49%) or make purchases through the Internet (43%) (43). In a survey of American Internet users, 40% of respondents reported they used the Internet to seek health or health care information or advice during the past year and 67% agreed their use of the Internet improved their understanding of symptoms, conditions or treatments in which they were interested (44).

2.3 Technology and Health

Technological advancements often result in improved disease prevention, more effective therapies and better treatments. Internet technology has the potential to contribute to and aid behaviour change, thus resulting in improved public health.

2.3.1 Interactive Health Communication

Interactive health communication (IHC) is broadly defined as “the interaction of an individual with or through an electronic device or communication technology to access or transmit health information, or to receive guidance and support on a health-related issue,” (45). The large and diverse audience for IHC includes health care consumers, caregivers and health practitioners, and the technology may focus on consumer, administrative, financial, or clinical uses. Physicians and administrators may use electronic patient records in the health services context; whereas consumers are more likely to access online resources, such as health

web sites and chat rooms to better understand symptoms, illness, and diagnostic procedures. Regardless of the audience, IHC's have the capacity to improve health, and play several roles in the health care context. IHC's may relay information, manage demand for health services, enable informed decision-making, promote healthful behaviours, facilitate communication between patients and physicians, and provide a platform for peer information exchange and emotional support (45); (46).

Consumers use interactive health communications in the form of online, web-based health information. They are able to access health and medical information and support networks, purchase prescription medication, and communicate with physicians and other health care professionals. IHC's enable those with minimal access, due to financial or geographic barriers, to access health services, and when properly designed, promote self-care. IHC tools provide users with the opportunity to engage in their own health care decision-making processes, and represent a powerful and economic medium for improving health.

Interactive health communications designed to aid behaviour change, such as smoking cessation interventions, are especially suited to Internet delivery, and offer several advantages to more traditional methods of information dissemination. Interventions delivered through the World Wide Web combine the advantages of mass media and interpersonal communication to elicit health behaviour change. Program providers may tailor messages to individual characteristics, preferences, and stages of change, and incorporate various media genres (including text, video, and audio) to ensure the needs of the target audience are met. Users may remain anonymous, access information 24 hours a day from any location, and seek continuous online peer and professional support. There is no limit to the number of users, allowing for widespread dissemination and minimal incremental costs for additional participants (45); (47).

2.3.2 Web-Assisted Tobacco Interventions

Evidence is emerging to suggest the efficacy of Web-assisted tobacco use cessation interventions. The first study to report the results of a web-based cessation program was published in 1999. Japanese researchers developed a program consisting of a web site providing facts on smoking and health, daily emails to participants, and a web-based forum for communication between users. After 12 months, 52% of smokers and 43% of heavy smokers remained abstinent. Although quit rates are likely inflated by a lack of control group and poorly reported methodology, findings are suggestive of the potential of web-based treatment (12).

More recently, three American studies further demonstrated positive results associated with web-assisted tobacco cessation interventions. In a small pilot study (N=49) evaluating a web-based cessation program, 92% of respondents reported they made a serious effort to quit, and 18% of participants remained abstinent at 30-day follow-up (10). In a larger study (N=370), 18% of participants reported being abstinent at 3 months (7-day point prevalence) (11). In both studies, participants responded favourably to a web-based intervention and Lenert (10) reported that 94% of participants believed that the site helped their quit efforts, despite encountering difficulty navigating it. In a 'real world' survey of the popular and widely disseminated web-based program, QuitNet, 7% of participants remained smoke-free three months after joining the program (intention to treat analysis) (31).

Although the studies described above reported positive findings, the results must be interpreted cautiously. None employed a comparison group against which to judge the programs' effectiveness. It is unlikely, given the expansive nature of the World Wide Web that participants accessed the study web sites exclusively, and it is possible that quitting

behaviour was a function of other factors rather than the web site alone. Additionally, relatively small sample sizes were employed and participant response rates were low. Given the number of smokers that may be using the Internet, it is difficult to generalize findings beyond those responding.

Despite study weaknesses, Web-assisted tobacco interventions show promise as an effective population health tool. Participant information confirms the expansive reach of the Internet and that smokers are searching the World Wide Web for tobacco use cessation information and support. The majority of QuitNet users learned of the site via search tools, and as of May 2004, the search engine Google referred an average of 650 visitors to the QuitNet site daily (31). Slightly more than half (53.7%) of participants were recruited to the Quit-Smoking-Network through links from Web search tools, and 18.7% learned of the study from postings to Internet discussion groups related to smoking cessation (11).

2.4 Challenges

Despite the immense potential, there are several challenges associated with delivery and dissemination of health information through the Internet. Due to the explosion in the amount of information available, consumers encounter increasing volumes of information and misinformation. Often they lack the necessary tools and skills to access and judge the quality of such information.

2.4.1 Quantity of Information

The quantity of information available through the Internet is overwhelming, and navigation increasingly complicated. Although impossible to quantify the exact size of the World Wide Web, changes in the number of web sites available indicate rapid growth. Early

in 1992, an estimated 2000 web pages existed; as of January 1, 2003, the number of pages online had increased to approximately 17 billion (48). Search engines, used by consumers to access web content, index only a fraction of available documents. Google, the largest search engine online, indexes only 4 billion documents. Thus, despite a plethora of content, access to appropriate information is increasingly complicated.

2.4.1.1 Information Economics

The value of the Web lies not in the quantity of information available, but rather in the ability of consumers to access and process such information. Herbert Simon once commented that, “a wealth of information creates a poverty of attention.” The amount of information available through the Web is growing exponentially; yet human capacity to use it likely increases only linearly. This is ultimately due to the fact that mental faculty and time available to process information are limited. This concept leads to a variant of Malthus’s law. In the 19th century, Malthus predicted that famine was inevitable; the number of mouths to feed was growing exponentially, yet the amount of food available was growing linearly. Today, this concept can be applied to information; Malthus’s law of information predicts that the proportion of information produced that is actually consumed, or processed by individuals, will, with time, approach zero (49).

In addition to the inability to consume information, as the volume of Web content increases, the probability of finding an appropriate document decreases. If the growth of information is exponential, then, by implication, so should the number of documents that match any particular search query. For a given amount of search effort, the probability of finding a document on the Web will decrease with time. The consequence of a global growth

in information supply may be an “information famine” in which consumers will be unable to find necessary information (50).

The challenge to public health professionals is to find economic ways of providing accessible and trustworthy information through the Internet; failure to do so may leave consumers prey to opportunists who may not share the same standards for information quality and goals for dissemination (51).

2.4.2 Quality of Information

In addition to overwhelming quantities of information and navigational difficulties, consumers risk accessing potentially dangerous misinformation. No controls exist for monitoring Internet content, and due to the anarchic nature, anyone is able to set up and publish on a web site. This leads to the risk that information may be misleading or incorrect even if the original sources were reliable. Furthermore, many use the Web in entrepreneurial endeavours, charging fees for information, services, and products. Although there is nothing inherently wrong with such practices, because web sites may fail to disclose financial interests or acknowledge the potential for conflict of interest, it can be difficult for consumers to discriminate between genuine insight and deliberate invention.

Since the public introduction of the World Wide Web, several authors have attempted to assess the quality of the health information available. In doing so, a new research discipline and associated methodologies have emerged; infodemiology (or information epidemiology) is the study of the determinants and the distribution of health information and misinformation prevalent on the Internet (52). The Internet is changing health care delivery, and as consumers become more active participants in the health care process they will depend on access to

reliable and accurate information. Infodemiological studies attempt to identify gaps in knowledge translation and markers for “high-quality” information.

2.4.2.1 Quality Indicators

With a surplus of information available at the click of a mouse, both novice and experienced Internet users may have difficulty distinguishing between valuable and harmful information. Users may be attracted to the technological brilliance of a web site and fail to recognise abysmal content. In an attempt to prevent physical, mental, and emotional harm to consumers caused by wrong, misleading, fraudulent, false, or self-serving information, several individuals and groups proposed basic standards for evaluating online information, and assessed the quality of existing online health information and services.

In the seminal article addressing the quality of medical information on the Internet, Silberg, Lundberg, and Musacchio argued that because content is of paramount importance, the basic set of criteria designed to judge printed information should apply to digital communication (16). Using this rationale, Silberg et. al. proposed a set of core standards in which to judge the quality of health information available through the Internet. Criteria include: full disclosure of *authorship*, including authors’ affiliations and relevant credentials; clearly displayed *attribution* of all references and sources; prominent *disclosure* of site ownership, including sponsorship and advertising policies, commercial funding arrangements or support, and potential conflicts of interest; and *currency* of information, including dates when content was posted and updated (16).

Despite their potential usefulness, Silberg’s criteria fail to address unique components of the Internet that distinguish it from other media. In 1998, the Health Summit Working Group (HSWG) developed a set of criteria to assess the quality of health information on the

Internet. The group, composed of health care providers, medical librarians, information resource professionals, web site developers and members of the public, put forth a policy paper and rating tool for assessing the quality of online health information(53). The criteria build upon the initial standards proposed by Silberg and colleagues and include criteria directly relevant to the Internet including interactivity, design, and assessment of links. Criteria include credibility, content, disclosure, links, design, interactivity and caveats. A description of each criterion is presented in Table 2-1.

Since the publication of the HSWG guidelines, others have continued to promote quality criteria, rating tools and third-party rating systems. To date, no single list of agreed upon criteria or methods by which to measure quality exists. However, in a review of 29 published rating tools and journal articles, 80% of criteria fell into one of 12 categories, including content, design and aesthetics of site, disclosure of authors, sponsors, or developers, currency of information, authority of source, ease of use, accessibility, and availability (54). Given that most authors agree on key criteria, creating and validating a set of user-friendly consensus criteria is important for ensuring health on the Internet.

2.4.2.2 Quality Filters

In addition to quality criteria, several Internet initiatives have been developed in attempts to ensure that consumers access credible and accurate health information web sites. Tools include conduct codes or recommendations for the development and content of web sites, user guidance systems that enable users to check if a site complies with certain quality standards, and quality labels awarded by third parties. Despite good intentions, these efforts are often costly to develop and maintain, onerous to the user, and lack a governing body with the ability or power to monitor the information posted, and are rarely validated (55).

Gateways are an additional tool for classifying information, and were introduced as an attempt to moderate the quality of health information readily accessible to consumers. Unlike search engines which index contents of the WWW automatically, gateways employ filters, manually or automatically, to accept or reject whole sites of information based on preset criteria (55). If the resources meet the identified criteria, searchable and browsable subject headings are created to describe the content of the resource, and the material is indexed so that it may be retrieved on a search of the gateway. A large investment is necessary to develop and maintain gateways, but they have great potential for providing convenient access to good quality information on the Internet.

2.4.2.3 Quality of Online Health Information

Several studies employed various criteria and rating systems to assess quality and reliability of information available online. Topics studied range from common health complaints including fever (56), ankle sprain (57), and back pain (58) to chronic and life-threatening illnesses such as depression (17;59) and various forms of cancer (60;61); results suggest that poor quality information is pervasive.

An early infodemiological study assessing the reliability of the management of fever in children concluded that despite an abundance of web pages available, few provide complete and accurate information (56). Web pages were retrieved systematically, and content was compared to published guidelines for managing fever. The study provided insight into appropriate methodologies, such as systematic searching, yet failed to apply rigorous criteria in judging information quality. The authors commented that judging the validity of information is challenging for the general public, but do not provide suggestions or tools in which to do so. They suggest there is an urgent need to check public-oriented health care

information on the Internet for accuracy, completeness, and consistency, yet fail to recognize this is not a viable option.

A series of studies on the quality of female reproductive health information available through the Internet suggests information quality is poor; none of the 53 web pages reviewed complied with each criteria necessary for quality (62-64). Quality was defined as, "the ability of the web site to satisfy stated and implied objectives," yet it is unclear whether or not a particular web site is able to satisfy objectives without meeting each of the suggested criteria. The criteria used to measure quality in this study, content and credibility, are not sufficient according to the HSWG recommendations.

The first study to question the validity of the Silberg benchmarks for measuring quality examined web-based information on treatment of depression. Griffiths and Christensen scored sites for quality using general site characteristics, evidence-based guidelines, and subjective measures, in addition to assigning accountability scores based on the Silberg criteria. None of the measures used to assess quality of content correlated significantly with the Silberg criteria score ($r = -0.5$ to 0.21). The findings question the usefulness of the Silberg criteria as indicators of web site quality and suggest the importance of further study into useful measures for assessing quality.

Further criticism of infodemiological studies came in the form of a systematic review; information of mediocre quality is prevalent on the Internet and poor methodological rigour is usually associated with such studies (15). Investigators studying online health information often inadequately reported research methodology, and presented only descriptive results. Criteria used to measure "quality" were inconsistent and sometimes subjective. Quality was often associated with a measurement of accuracy; however, only 62% (49/79) of studies employed evidence-based guidelines or systematic reviews to measure accuracy and those

relying on subjective assessments of accuracy found fewer inaccuracies. Many studies used the terms 'web site' and 'web page' interchangeably making comparison difficult, and oftentimes poorly described the sampling and selection strategies used.

Recent studies have attempted to examine the validity and predictive value of quality criteria using analytic techniques, yet employed criteria inconsistently and often limited the assessment criteria to those proposed by Silberg. Results of a survey of miscarriage-related web sites are suggestive of the limitations of credibility criteria (65). Web sites were reviewed and assigned Silberg scores and accuracy scores based on the Royal College of Obstetricians and Gynaecologists' guideline information for spontaneous abortion. Findings suggest that Silberg and accuracy scores were not correlated ($R_s = 0.35$). However, results are of limited value given that other quality indicators proposed to be important in judging online information were not assessed. Study conclusions are restricted due to the small sample size ($N = 19$) and lack of generalizability beyond miscarriage information web sites.

Kunst and others (57) measured the correlation between credibility criteria and accuracy of health information on five common health topics, including chronic obstructive pulmonary disease, ankle sprain, emergency contraception, menorrhagia, and female sterilisation. Credibility was assessed by the report of information sources, currency of the site, and the hierarchy of evidence. Accuracy of the web site was judged against rigorously developed, peer-reviewed, and published guidelines for each of the five topics; web sites were then categorised according to guideline statement coverage. The relationship between credibility features and level of accuracy of contents were measured using Kendall's rank correlation. Web sites with higher credibility scores had a higher level of accuracy of contents; however, the relationship was not significant. Results are suggestive of the value of

quality criteria, yet may be limited due to the deletion of other potential quality indicators, such as navigability and interactivity.

Other studies suggest the presence of associations among individual criteria, such as disclosure of copyright information, references, and accuracy. In their review of web sites providing information for managing fever in children, Fallis and Frické (66) tested whether proposed indicators of web site quality correlated with accuracy. Overall accuracy scores were determined by comparing web site content with recommendations of authoritative sources on treatment of fever in children (*Merck Manual of Medical information and Fever in Pediatric Practice*). Presence of the Health On the Net Code logo, displaying copyright information, and having an organisation rather than commercial or educational domain may be used to distinguish accurate from inaccurate health information (contingency tables and chi square). However, as with other infodemiological studies, the results are not generalizable and consumer reliance on individual criteria for web site assessment may not be practical or effective.

2.4.3 Quality of Online Tobacco Use Cessation Information

To date, three studies examining the content and quality of tobacco use cessation information available through the Internet are published. Similarly to general health information, tobacco use cessation information seems to be overly abundant and of variable quality. As with other infodemiological studies, methods used to select sites and assess quality varied. None of the three studies under review employed the same criteria for measuring quality, or used the same definition of a smoking cessation intervention. Two studies measured the presence of evidence-based content against recommendations provided in the Clinical Practice Guidelines for Treating Tobacco Use and Dependence (18;19),

whereas the third referred to the Cochrane Database of Systematic Reviews (Tobacco Addiction Group) (67).

In their study examining the quality of treatments for smoking cessation available through the Internet, Bock and colleagues (19) concluded that although web sites provided accurate information, they were very difficult to find. From a list of 202 potential web sites generated through searching, only 46 (23%) provided a direct intervention through the Internet. No inaccuracies were detected in 89% of sites evaluated, yet only 11% provided adequate/extensive coverage of the US Public Health Services Guidelines for Treating Tobacco Use (19).

Cheh, Ribisl, and Wildemuth (18) made similar conclusions; the majority of the 30 Web sites reviewed contained accurate and useful content congruent with published smoking cessation recommendations, yet they often failed to mention key information. Additionally, few of the web sites reviewed addressed the proposed standards for measuring quality (i.e., accessibility, usability, source credibility, and currency). Less than half (40%) of sites provided a search mechanism, and only 20% of sites posted contact information for site authors. Few sites (30%) displayed a disclaimer stating that limitations of the information provided, and even fewer (17%) displayed the date when the site was last updated.

In their assessment of the quality of smoking cessation information, Ademiluyi, Rees and Sheard (67) used existing quality assessment tools (Information Quality Tool (IQT), DISCERN, and Quality Scale (QS)), and attempted to measure the relationship between site characteristics (i.e. ownership, evidence-based content) and quality. The authors concluded that contents of the web sites were of variable quality, yet such findings are not surprising given that the three tools used define and measure quality differently.

Significant relationships were found between quality scores and site ownership, depending on the tool used to measure quality. As measured by the IQT, the quality of sites produced by non-commercial organisations (e.g. universities) was significantly higher than those produced by commercial organisations (e.g. pharmaceutical companies), whereas QS scores differed significantly between non-commercial organizations and private practices. DISCERN scores differed significantly between private practices and non-commercial organizations and between private practices and commercial organizations. Additionally, trends suggested that sites containing some evidence-based information scored higher on quality than those without, yet the significance of the relationship varied between evaluation tools. These results underscore the importance of establishing a consistent and valid tool for consumers to use when accessing health information on the Internet.

Despite the differences in methodologies associated with each study, the authors consistently reported that tobacco use cessation information is difficult to find. Searching for cessation information using common terms, such as “quit smoking,” “stop smoking,” and “smoking cessation” yielded a large number of web sites, yet less than one quarter of web sites retrieved through each search provided relevant information (18;19;67). Such results suggest that smokers are more likely to access web sites purporting to help them, rather than evidence-based treatment options or effective tools for smoking cessation.

2.5 Tobacco Use Cessation and the World Wide Web

The World Wide Web holds great promise for tobacco control, yet some caution that its presence may be a “public health disaster in the making” (68). The Internet represents a marketing panacea to the tobacco industry; advertising restrictions are limited and poorly enforced, and retailers offer discounted cigarettes to anyone with a valid credit card. Despite

the prohibition of cigarette advertising on all electronic media (including the Internet) in the United States, RJ Reynolds advertises its Eclipse cigarette online at www.newcig.com, encouraging users to purchase the cigarette that, “may present less risk of certain smoking related disease, leaves no lingering odour and reduces second-hand smoke by 80%” (69).

In contrast, the Internet also has the potential to be a key element in combating the tobacco epidemic. It is an ideal medium for the dissemination of information to the general public regarding the health effects of tobacco use, cessation, and activities of the tobacco industry (70). In particular, disseminating tobacco use cessation information through the World Wide Web offers several benefits to more traditional delivery devices. Users may access individually tailored programs anonymously, constantly, and at minimal cost. As with any information delivered through the Internet, consumers risk accessing irrelevant, fraudulent, and misleading information.

Studies of the quality of online tobacco use cessation information provide evidence that useful information is available, yet failed to address the methodological questions of validating measures of quality and testing of web retrieval systems. A mechanism by which consumers can reliably assess or efficiently retrieve internet-based health information does not exist. The present study addresses the need to develop methods and instruments to guide consumers to quality information, specifically related to tobacco use cessation, on the Internet.

Table 2-1: Criteria for Evaluating Internet Health Information

Criteria	Definition
Credibility	A credible web site offers reasonable grounds for being believed; components of credibility include source, currency, and presence of an editorial review process.
Source	Web site clearly displays the name and logo of the institution, or the author's name. References are provided where appropriate.
Currency	Web site has been updated recently and information displayed is up to date with the current state of knowledge.
Editorial Review Process	If a web site subscribes to an editorial review process (e.g. Health On the Net), a list or link to the criteria required for approval is clearly displayed.
Content	Content refers to the type and quality of the information provided. Components necessary to assess content include accuracy, completeness, and presence of a disclaimer.
Accuracy	Web site providing evidence-based content verifies claims by citing references and indicating the level of scientific evidence.
Disclaimer	Web site describes the limitations, purpose, scope, authority, and currency of the information provided.
Completeness	Web site provides balanced information; opinions are identified and one-sided views are avoided.
Disclosure	Disclosure allows consumers to adequately understand the intent of the individual or organization providing the information, and enables them make informed decisions regarding their interaction with the web site. Components of disclosure include purpose and collection of information.
Purpose	Web site clearly states objectives or purpose.
Collection/Profiling of Information	If a web site collects information from the user (e.g. personal information, patterns of use), a clear disclosure of the information collected is necessary.
Interactivity	Interactivity is the presence of an interface for communicating with the web site provider and other users; components of interactivity include feedback mechanisms, communication media with other users, and tailoring.
Mechanism for feedback	Web site clearly displays author contact information in the form of address, telephone number, or email address.
Chatrooms and/or Bulletin Boards	Web site users are able to communicate with other users via a mechanism on the web site, such as a chatroom or bulletin board.
Tailoring	If a web site provides an interactive service, such as tailoring of information to the user based on a clinical algorithm (e.g. stages of change), the algorithm used should be clearly displayed.
Design	Design refers to the layout of the web site and links to external information. Design does not necessarily affect the quality of the information, but is important for ensuring an effective delivery and use of information. Components of design include navigability and internal search capability.
Navigability	Web site is easy to follow and site maps are available.
Internal Search Capability	Web site provides an internal search engine enabling users to find specific information on the web site.
Links	Links are connections to other internal pages or external sites that form the web-like structure of information.
Caveats	Clarification of whether site function is to market products or services or is a primary information content provider

Chapter 3 - Methods

3.1 Introduction

This study is a cross-sectional assessment of the quality of web sites accessed using three different search tools available through the World Wide Web. The methods were designed to address three main research questions:

1. What is the quality of self-help tobacco use cessation interventions available through the World Wide Web, where quality is defined by the web site evaluation score and judged according to the presence of necessary and factual information?
2. How does the quality of web-based, self-help tobacco use cessation interventions compare according to the Internet search tool used to access sites, i.e. general search engines, privately-administered gateways, and publicly administered gateways?
3. What is the relationship between general evaluation criteria and evidence-based criteria for self-help tobacco use cessation interventions available through the World Wide Web?

Chapter Three provides an overview and discussion of the methods used, including sampling procedures and relevant information related to Internet search tools and selection criteria, web site evaluation checklists, and the data collection protocol. The chapter concludes with a description of the statistical analyses performed.

3.2 Sample

Similar to a cross-sectional study involving human participants where data is collected from a defined population, web sites were selected from three different populations. Three

types of Internet search tools, search engines, privately-administered gateways, and publicly-administered gateways, were used to define the population. The search strategy and inclusion criteria were then used to identify the sample of web sites from within each population.

3.2.1 Sample Size

It is impossible to quantify the population of web sites providing self-help smoking cessation information from which to draw a sample. Thus, the aim of the sampling strategy was to select web sites that are readily accessible and available to users searching for cessation information.

The objective was to select 300 web sites; 100 web sites from each search tool, using preset inclusion/exclusion criteria from the pool of available web sites, where each web site was defined as a unique URL. It is unlikely that users would access more than 100 sites, and it was expected that a sample size of 100 web sites in each group would be sufficient to perform statistical analyses.

3.2.2 Sample Source

Three different Internet search tools, a search engine, a privately administered gateway, and two publicly administered gateways, were used to select web sites. Specific search tools included: 1) Google (search engine), 2) Allhealthnet.com (privately administered gateway), and 3) the Canadian Health Network and healthfinder (publicly administered gateways). Each tool provides users with a searchable database of web sites; however, gateways differ from search engines in that they are compiled by human editors and index only the sites that meet specific inclusion criteria. Unlike privately administered gateways, publicly administered gateways are offered by government agencies and have no commercial

interests. The choice of specific search tools was based upon these features, popularity of the search tool, indexing criteria, geographic origin, and the number of sites yielded during preliminary searching.

The search engine Google (www.google.ca) was used to search for web sites. Google is a major search engine with an index of over four billion pages, likely to yield dependable results and provide a comprehensive record of the material available. Google is the most popular search engine available through the Web, performing approximately 250 million searches per day (71) or 55% of all searches on the World Wide Web (72). Google was voted as the most outstanding search service by Search Engine Watch subscribers four years in a row, and in 2003 won individual categories for best design, best search feature, and best images search engine (73).

To identify potential sites and collect web site addresses, the privately administered gateway AllHealthNet.com was used. This gateway aims to provide consumers with the most comprehensive, highest quality source of medical and health information on the Internet, and claims to be “the thread that holds the medical community together globally” (74). The information indexed by AllHealthNet.com is targeted to both individuals and health care professionals, does not require registration by the user, and is free to use.

Publicly administered gateways are similar to privately administered gateways in that the index of web sites is created by an individual and that each web site must meet specific criteria for inclusion. However, publicly administered gateways do not accept advertising or outside resources, and funding support is received from federal government agencies. Although exact criteria for indexing web sites vary slightly between the Canadian Health Network and healthfinder, both aim to provide consumers with valid and reliable information. Publicly administered gateways may target general health information seekers and health

professionals. Users are not required to register and the service is free to all. Additionally, the selected publicly-administered gateways originate from countries that are similar in regard to their approaches to tobacco control, and are at parallel stages in the “tobacco epidemic” (75). Smoking prevalence is on the decline, smoke-free environments are key political issues, and several existing tobacco control policies are analogous (76).

Appendix 1 (Search Tools) further describes the operation, function and rationale for choosing the selected search tools.

3.2.3 Sample Selection

The sample selection process was informed by guideline procedures for selecting articles for a systematic literature review. As per recommendations made in the Cochrane Reviewer’s Handbook, search tools from which to draw the sample were identified, the search strategy was defined, and inclusion and exclusion parameters set (77).

3.2.3.1 The search strategy

The goal of the search strategy was to retrieve health information web sites purporting to provide quit smoking information to consumers. In theory, it is possible to select a random sample of web sites by randomly selecting individual Internet protocol (IP) addresses; however this strategy is not practical, nor is it likely to be representative of the sites most often accessed by consumers. The aim then, was to utilize a combination of search terms that a smoker seeking self-help information on the World Wide Web may use.

Determining an appropriate search strategy was limited by the lack of research into how consumers search for online tobacco use cessation information. It was beyond the scope of the study to survey individuals on their searching behaviours; thus the search strategy was

informed by webmaster submission tips to crawler-based search engines, instructions to users on how to search for Web-based information, and the limited research available.

3.2.3.1.1 Literature:

The literature regarding tobacco use cessation interventions and online searching is sparse. Eckldorna and Groman used the search string “stop+smoking” in their examination of evidence and non evidence-based products offered for smoking cessation on the World Wide Web (78). More recent studies examining the quality of cessation information on the Web have combined phrases such as, “quitting smoking,” “stop smoking,” “giving up smoking,” and “smoking” with and without employing Boolean operators (19;67). However, no rationale was provided for the search terms employed, and no attempt was made to survey users on their searching behaviour.

In a qualitative study investigating the methods consumers use to access online smoking cessation resources, participants used a variety of search terms. The phrase “quit smoking” was used most commonly (79); thus, despite a small sample size, it was determined to be important to include the term “quit smoking” in the present study.

3.2.3.1.2 Refining Search Terms:

Users often employ search queries of more than one search term (80); and therefore, it is important to employ several search phrases when conducting infodemiological studies. The phrases, “quit”, “stop smoking”, “quit smoking”, and “smoking cessation” were selected through an iterative process to identify relevant sites likely to be accessed by consumers.

Initially, the primary researcher (CCM) and a research assistant (MF) generated a list of seventeen possible terms that may be used by individuals seeking smoking cessation

information (See Appendix 2). Each phrase was entered into the search engine Google (February 28, 2003), and the number of web sites retrieved was recorded. Phrases were enclosed in quotation marks, thus enabling “phrase searching” whereby the term is searched exactly as keyed. A brief overview of the results page was conducted to determine whether sites were relevant to the purpose of the study.

Search terms yielding irrelevant web sites (“ending smoking”, “ceasing smoking”, “end smoking”, “cease smoking”, “anti-smoking program”, “smokers anonymous”, and “last cigarette”) were discarded. Discarded terms did not retrieve web sites with the purpose of providing self-help tobacco use cessation information; rather, these sites most often reported on population health strategies, funding strategies, and legislation for tobacco control.

The remaining ten terms (“quit,” “quit smoking,” “quitting smoking,” “stop smoking,” “stopping smoking,” “how to stop smoking,” “how to quit smoking,” “smoking cessation,” “smoking cessation program,” and “stop smoking program”), appeared to yield web sites with relevant cessation information. The phrases “quit,” (4.7 million), “quit smoking” (464,000), “stop smoking” (414,000), and “smoking cessation” (349,000) yielded the greatest number of potential web sites. From these results, it was decided that an appropriate search strategy would be a combination of the terms “quit,” “stop smoking,” “quit smoking,” and “smoking cessation” using the Boolean operator “OR”. The “OR” command is used in database searching to retrieve synonymous concepts and/or terms; “OR” logic collates search results to retrieve all unique records containing any of the specified search terms.

3.2.3.2 Inclusion and Exclusion Criteria

The objective of this research was to determine the quality of self-help smoking cessation interventions available online. Inclusion criteria were necessary to limit the

evaluation to relevant sites. Self-help interventions may be defined as any manual or programme to be used by individuals to assist a quit attempt not aided by health professionals, counsellors or group support (29). Guides may range from brief motivational pamphlets to comprehensive step-by-step manuals for both initial cessation and relapse prevention, and may include access to adjuncts such as telephone hotlines (28). Web sites were included if they purported to provide self-help quit smoking information according to this definition. Web sites could provide brief information on the health effects of smoking, information on quit-smoking strategies, or structured approaches. Included web sites could be aimed at smokers in general, could target particular populations of smoker (i.e. different ages or ethnic groups), or could be interactively tailored to individual smoker characteristics. The third criterion for inclusion was that web sites display information in English.

Web sites that did not meet the purpose of providing information to aid a smoker in a quit attempt were excluded. Web sites exclusively promoting or selling cessation aids with no information intervention, sites mentioning smoking cessation incidentally, sites that linked only to external information, dead links, and sites requiring paid registration were also excluded. Figure One provides a visual representation of inclusion and exclusion procedures.

3.3 Data Collection Procedures

Data collection occurred in two phases: 1) web site selection and 2) web site evaluation and agreement. Web site selection processes included training research assistants and selecting sites for evaluation. Web site evaluation included training of research assistants regarding evaluation protocol and conducting site evaluations.

3.3.1 Web site selection

The selection of potential web sites occurred in two separate stages. Initially a list of eligible web sites was selected; due to technical difficulties, described below, the web selection process was repeated.

3.3.1.1 Research Assistant Training

Research assistants were hired to conduct the web site selection, thus ensuring that web site evaluators would remain blind to the search tool source. Research assistants received explicit instructions detailing web site selection procedures (See Appendix 3 – Web Site Selection Detailed Protocol) and conducted training exercises where the principal researcher was available to answer questions and clarify web site inclusion procedures.

3.3.1.2 Web Site Selection I

Using Internet Explorer 6.0, the research assistant submitted the specified search query (“quit smoking” OR “smoking cessation” OR “quit” OR “stop smoking”) into the search tools Google, AllHealthNet.com, the Canadian Health Network, NHS Direct, healthfinder, and healthinsite between January 5 and 9, 2004. Search results were printed. Following the initial search, each web site was screened for the presence of information related to smoking cessation and assessed for inclusion (See Appendix 4 – Intake Form). If inclusion criteria were not met within three levels of the start page, the site was excluded from review. This protocol is similar to that used by Bock et. al. (19), and presumes if users are unable to find relevant information within three clicks of the start page, they are unlikely to remain on the site. Web site intake data were entered directly into a Microsoft Access database.

AllHealthNet.com does not allow for Boolean searching; thus, search terms were entered separately, and a strategy was developed to approximate as closely as possible a combined search. Four separate lists of web sites were generated simultaneously in four separate windows, using each search term. The four lists were then combined into a single "meta-list" in the rank order assigned by AllHealthNet.com. Web site rank was based on All Health Net's rating system, which assigns each web site a relevancy "score" according to the presence of the search term within the web site. For example, the top web site generated from the phrase "quit smoking" had a score of 52%, while the top web site generated using the phrase "stop smoking" had a score of 69%. Therefore, the web site with the 69% score was placed ahead of the web site with the 52% score on the combined list.

All included web sites were saved to the hard drive of the computer used to conduct the web selections using the program WebZip 5.0 (81). WebZIP is a "crawler" program that crawls through a particular web site, saving all of its accessible content to disk. WebZip allows users to view web sites, offline, at a later date.

It was proposed that by saving and transferring downloaded files to a CD, web site evaluators could simulate the evaluation on the same day that the site was selected. However, the software did not perform as expected; file names did not transfer directly. A list of saved web sites was not generated, and therefore saved sites could not be accessed on other computers. WebZip support suggested a solution to enable CD saving; however this was unsuccessful. An attempt was then made to save the included web sites using a newer version of the software (WebZip 6.0); however, download procedures stalled and caused the computer to crash.

Upon consultation with the thesis committee and due to these technical difficulties, it was decided that the web sites would be evaluated online, rather than from a saved copy.

Rationale for this decision was based on data collection procedures of cross-sectional studies involving humans; participants are not usually surveyed at the same time they are selected to participate. Due to the time lapse between web selections and potential web site evaluation, the original sample selected was not used. Web sites were re-selected to ensure the most up-to-date list of web sites was created.

3.3.1.3 Web Site Selection II

Web site selection procedures were identical to those conducted during the first round of web site selections (See Figure One) (all figures are at the end of the Methods section); however, changes were made to the public gateway tools employed. Upon initial searches, it appeared evident that by searching the public gateways, Canadian Health Network and healthfinder, a sufficient list of web sites would be retrieved; therefore, healthinsite (<http://www.healthinsite.gov.au>) and NHS Direct Online (<http://www.nhsdirect.nhs.uk/>) were not searched in the second round of web site selection. Thus, Internet search tools were restricted to Google, AllHealthNet.com, the Canadian Health Network and healthfinder. Upon searching, query results were printed and saved using Adobe Acrobat 5.0 (82).

All searches were conducted between February 20, 2004 and February 29, 2004. Search results were saved and inclusion information entered directly into a Microsoft Access database. Backup copies of included web sites were saved using the offline browser, MetaProducts Offline Explorer Pro 3.0 (<http://www.metaproducts.com/>) between March 8 and 10, 2004. The program, Offline Explorer Pro, is similar to WebZip; web sites can be saved to computer hard drives and CDs. Because the program does not efficiently save the entire web site, the saved copy was used as a back up in the event of a discrepancy or major changes between the site evaluated and that selected.

3.3.2 Web Site Evaluation

Web site evaluations were conducted independently by two reviewers. Web site evaluation procedures included training, reassessment of web sites for inclusion, web site evaluation, and overall evaluation agreement. Quality was measured using an evaluation checklist to assess inclusion of general health information criteria and the presence evidence-based tobacco use cessation information. Figure Two details the web site evaluation protocol and data entry procedures.

3.3.2.1 Web Site Reviewer Training

Two web site reviewers, the primary researcher (CCM) and a research assistant (HMW) initially met to discuss the proposed evaluation checklist, operational definitions, and coding schemes. The purpose of the discussion was to ensure both reviewers were familiar with the quality rating tool, and to clarify any associated ambiguities. Following the initial meeting, the reviewers independently tested three sites and compared the congruency between the three 'piloted' web sites. Upon independent review of the three web sites, clarifications were made to the definitions and evaluation protocols. A final reference manual was distributed to both reviewers prior to assessment of web sites (See Appendix 5 – Reference Manual).

3.3.2.2 Web Site Evaluation Protocol

Following web site selection, each reviewer received a list of eligible web sites. To ensure that reviewers remained blind to the search tool used to identify web sites, only the study ID and URL were included. Prior to evaluating, reviewers assessed web sites to ensure that inclusion criteria were met.

Using the Web Site Evaluation Form (Appendix 6 – Evaluation Form), information quality was scored by critically examining the selected web sites. Web site assessments were conducted independently by both reviewers. Often, it was not necessary to review each page contained within the web site to assess quality criteria; relevant information related to standard and evidence-based criteria for effective smoking cessation interventions was examined. Web sites were evaluated between March and April, 2004. Tables 2 and 3 describe criteria categories and operational definitions.

When user registration was required to access a web site, the pseudonym “Quality Quit” was entered. Quality was a 24 year-old female smoker, she smoked her first cigarette between six and 30 minutes after waking and had made 2 quit attempts. Quality smoked 14 light/mild cigarettes per day. She lived in Montreal, Quebec and the email address was:

Several web sites sent confirmation and supporting emails; however, these messages were not evaluated for quality, and the email address was used for web site registration purposes only.

All discrepancies between the two evaluators were noted and resolved by reviewing and discussing the survey items in dispute to reach consensus. A third reviewer (CYL) was identified in cases of disagreement; however, there was no need to consult with the third reviewer. Agreement was completed by June 30, 2004.

Following 100% quality scoring agreement, evaluation data were double-entered into a Microsoft Access 2003 database. Data was checked for data entry agreement; inaccuracies were compared to the original quality checklist forms. Upon 100% agreement, data were synthesized into one table of web site evaluation data. Data tables (inclusion information and quality scores) were combined to enable analysis.

3.4 Evaluation Measures

An evaluation framework was developed to assess the quality of online tobacco use cessation information by drawing upon models proposed by the Health Summit Working Group (53) and the US National Cancer Institute (30). This framework was designed to judge standard evaluation criteria for assessing the quality of health information and the presence of evidence-based information for effective tobacco use cessation treatment.

3.4.1 Evaluating Standard Criteria for General Health Information

Guidelines for assessing the quality of Internet health information developed by the Health Summit Working Group formed the basis of the checklist to determine standard criteria scores (53). The Health Summit Working Group guidelines are comprehensive, and include examination of features unique to interactive health communication, such as interactivity and design. Questions designed to assess standard criteria for general health information were modified from the Information Quality Tool (IQT); a publicly available checklist developed by the HSWG and designed to help consumers assess the quality of health information online (<http://hitiweb.mitretek.org/iq/default.asp>).

The Information Quality Tool is a 21-item checklist and scoring system for judging the quality of online health information, designed for general consumer use. Specific criteria designed to measure general information quality include credibility, content, disclosure, interactivity, and design. A credible site offers reasonable grounds for being believed and may be judged through acknowledgement of information sources, currency and relevance of the information posted. Content refers to the type and quality of the information provided. Assessment of accuracy and completeness of information, and the presence of a disclaimer determine content quality. Assessment of disclosure allows consumers to understand the

intent of the individual or organization providing the information, and enables them to make informed decisions regarding their interaction with the web site to ensure privacy and protection of confidential information. Interactivity of a web site refers to the presence of an interface for communicating with the web site provider and other users of the site.

Components to address include the presence of feedback mechanisms, other communication media, and information tailoring. Design features relate to the layout of the web site; poor design does not necessarily affect the quality of information, but is important for ensuring effective delivery and use of information. Components to assess are navigability of the site and internal search capabilities.

The IQT employs an automatic scoring system; the score is an indication of how well a site answered the questions, but does not guarantee the quality or accuracy of a site. The IQT considers three criteria to be essential, 1) inclusion of author's credentials, 2) providing a means to contact the author, and 3) a personal judgement of the quality of information. When these criteria are not met, the IQT does not calculate an evaluation score. Although each item requires a yes or no answer, items are weighted according to their importance. Items perceived to be most important are given a weight of 1, and the three items weighted 1, listed above, must be answered for the site to pass. Total scores may range from 0 to 4. Modifications were made to the checklist in order to satisfy study objectives, clarify operational definitions, and establish a more useful scoring system.

For the purposes of this study, scoring of the three essential criteria was modified to enable calculation of an overall quality score and thus analysis of the data using inferential statistics. Five questions were added to the checklist to further explore credibility, content, disclosure, and design (Items 6, 9, 10, 14, and 16). The Health Summit Working Group guidelines describe the importance of assessing the presence of a purpose statement,

disclaimer, and information exchange; however, such questions are not present on the IQT. An additional question was added to assess the level of reference information provided (i.e. peer-reviewed or popular press). Finally, a question was added to assess the presence of a site map. Site maps are an additional navigational tool, not included on the IQT.

Appendix 7 provides a detailed description of checklist questions, their relationship to IQT items, and rationale for the changes made.

3.4.2 Evaluating Evidence-based Criteria for Tobacco Use Cessation

Guidelines for essential elements of self-help smoking cessation programs, published by the U.S. NCI (30), form the basis of the checklist to determine evidence-based scores. The NCI guidelines recommend that, at minimum, any self-help/minimal intervention program should: 1) include information about the health and social consequences of smoking, 2) include specific strategies and exercises for successful quitting, 3) include specific strategies for maintenance and avoiding relapse, and 4) be easy to read. The NCI guidelines provide recommendations for general content and structure, but do not define specific strategies or information necessary for inclusion. Specific strategies and operational definitions were derived from the U.S. Clinical Practice Guidelines for Treating Tobacco Use and Dependence (83) to assess the general NCI guidelines.

The U.S. Clinical Practice Guidelines for Treating Tobacco Use and Dependence recommend cessation interventions demonstrate the acute, long-term, and environmental risks of tobacco use, and the potential benefits of stopping tobacco use. Specific strategies and exercises for successful quitting should encourage setting a quit date, provide instruction on soliciting social support, recommendations to remove tobacco products from the environment, and guidance to anticipate challenges to a quit attempt. Other important information to

provide includes problem solving and/or skills training to increase coping skills, information on how to deal with withdrawal symptoms, and appropriate recommendations for using pharmacologic aids. Support and access to other potential support resources and suggestion of strategies for maintenance and avoiding relapse should also be incorporated in a cessation program. Appendix 8 describes the checklist questions and provides a comparison of the NCI guidelines and corresponding clinical guidelines used to develop the checklist.

Web site reading level was assessed using the Flesch-Kincaid Grade Level Score available in Microsoft Word 2000 (84). This index computes readability based on the average number of syllables per word and the average number of words per sentence. The Flesch-Kincaid index is unable to discriminate material less complex than the third grade or more complicated the twelfth grade; however study protocols only required a seventh grade distinction.

Two sample passages of text of approximately 100 words (continuous text without graphics) were identified from the web site start page and from a second web page chosen, to assess readability. The second section of text was assessed to avoid the nontypical writing style that is often observed in introductory paragraphs. The 'copy' and 'paste' functions were used to copy sample text into a Microsoft Word Document. The 'tools' menu was then used to obtain readability statistics (Flesch Reading Ease and Flesch-Kincaid Reading Level) for each web site.

3.4.3 Web Site Evaluation Scoring

The purpose of the evaluation checklist was to determine a total web site score from which to judge overall quality. Standard scores and evidence-based scores were combined to determine total quality scores.

3.4.3.1 Calculating Standard Scores for General Health Information

Raw scores were calculated for each site by summing item responses for each of the 22 standard criteria. Items 11, 12, and 22 were rated by each evaluator, and thus the mean rating score was used in the scoring calculation. Three items used on the standard evaluation checklist included a “not applicable” response (items 5, 14, and 17); when the not applicable response was applied, 0 rather than 99 was used to calculate the raw score. Raw scores ranged between 0 and 22.

Percent scores were calculated by dividing the raw score by an adjusted denominator; when items were deemed to be not applicable (i.e. 5, 14, or 17) the total possible score was adjusted appropriately. Denominator scores ranged from 20 to 22. Possible standard scores ranged from 0 to 1.0

3.4.3.2 Calculating Evidence-based Scores for Cessation

Evidence-based scores for cessation were determined using the 15-item checklist. Raw scores were calculated by summing individual item responses for each of the evidence-based criteria. Percent scores were calculated by dividing the evidence-based raw score by 15. Possible evidence-based scores ranged from 0 to 1.0.

3.4.3.3 Calculating Total Quality Scores

Standard scores for general health information and evidence-based scores were combined to calculate total quality scores. Raw scores were added and divided by the adjusted denominator. Raw scores for total quality ranged from 0 to 37 and denominator scores from 34 to 37, and total quality scores calculated as a percent. Total quality scores ranged between 0 and 1.0.

3.5 Statistical Analysis

All data were analysed using the S-Plus 6.2 (Student Version). Web site scores were calculated to judge the quality of self-help tobacco use cessation interventions available online (Research Question #1). Frequency functions, including means and standard deviations were calculated for total, standard, and evidence-based quality scores.

Fishers' Exact Tests were performed to determine if significant differences exist in the inclusion of quality criteria (i.e. identification of authorship, current information) between search engines and public gateways (Research Question #2). Due to the small number of web sites retrieved by the Private Gateway, these web sites were not included in the analysis.

One-way analysis of variance (ANOVA) testing was performed to test the hypothesis that the quality of web-based, self-help tobacco use cessation interventions differs according to the tool used to access web sites. ANOVA tests rely on three assumptions, 1) the variable under examination is normally distributed, 2) variance is the same in each group, and 3) all observations are independent (Research Question #2).

Application of the multiplicative rule of probability confirms the assumption that all web site scores were independent. The search tools used in this study employ different selection and retrieval procedures; thus, it is reasonable to assume that each tool selects sites independently and that the outcome of a search using one search tool does not affect the outcome of another. The Multiplicative Rule of Probability states that the probability that two events (both A and B) will both occur is equal to the probability of A times the probability of B, given that A has already occurred. So, if A and B are independent and event B occurs, the outcome of A is not affected. In this case, if a particular URL is retrieved through Google, there is no reason to expect it would not be selected by a public/private search tool. The

search tools used in this study do not coordinate indexing of web sites between them.

Bonferonni post hoc comparisons were conducted to compare mean quality scores between search tool pairs.

Pearson correlations were run to examine the relationship between general evaluation criteria and evidence-based criteria for self-help tobacco use cessation interventions available through the World Wide Web. A linear regression model was fit to further explore the data (Research Question #3).

Web sites, as a unit of analysis, were defined by unique URL address. In some cases, for each search tool more than one unique URL was associated with a common home page. For example, the unique URL's <http://www.cdc.gov/tobacco/issue.htm> and <http://www.cdc.gov/tobacco/quit/quittip.htm> both linked to the homepage <http://www.cdc.gov/tobacco/> which was also evaluated. Because of the influence such "duplicate" web sites could have on the statistical outcomes and threats to statistical assumptions (i.e. independence), duplicate web sites were eliminated from the analysis. Web sites with a URL closest to the "homepage" were included.

Figure 3-1: Web Site Selection Procedures

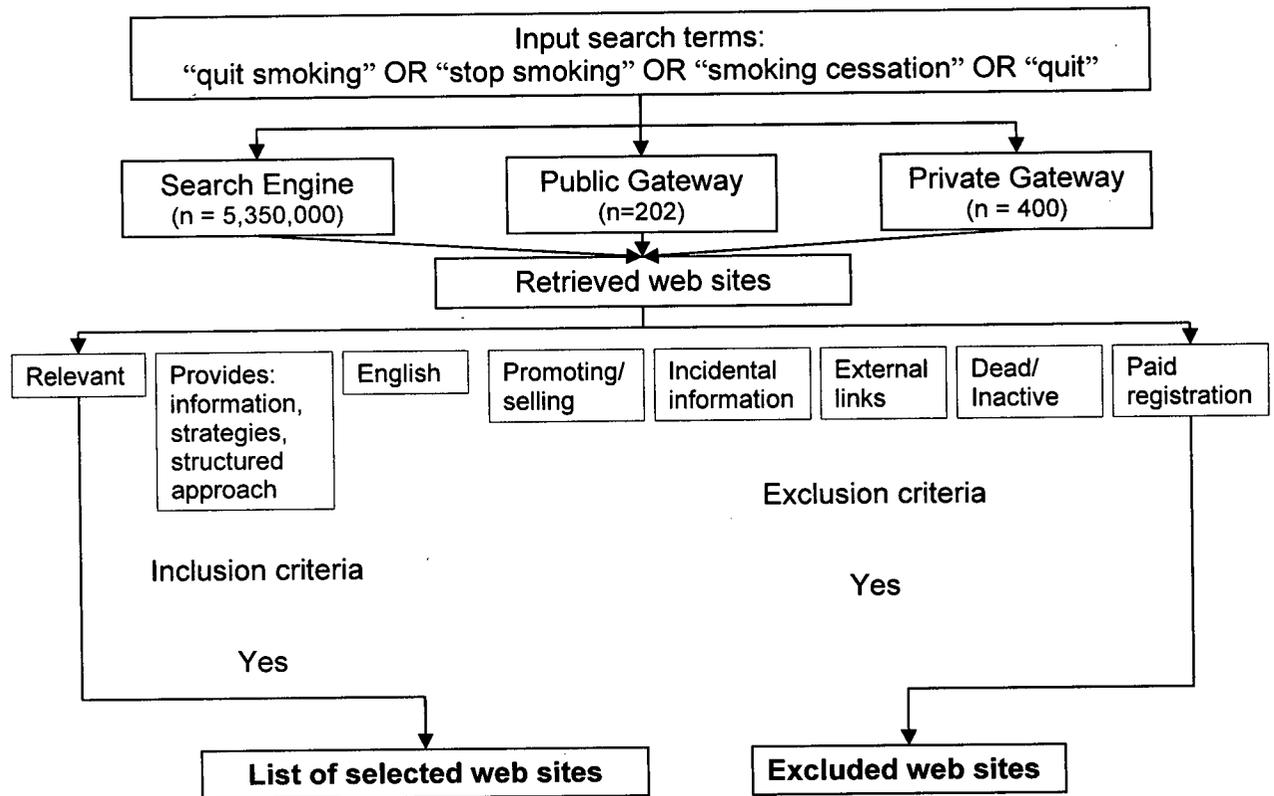


Figure 3-2: Web Site Evaluation Protocol

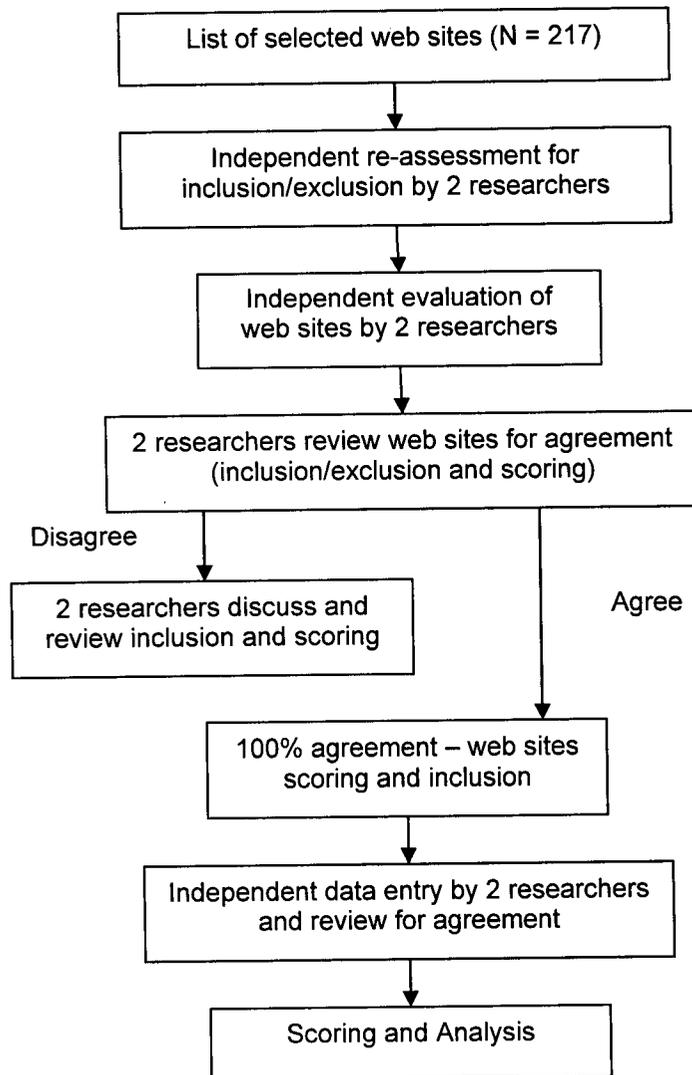


Table 3-1: Description of Standard Quality Criteria

Characteristic	Operational Definitions
Credibility	
Author Identified	The name of the author (the web site provider, person or organization who owns or operates the web site) is clearly displayed on the home, "about us" page, or "advisory/editorial board" page. The author name does not include the web host or site developer.
Author credentials identified	Credentials are defined as the qualifications of the author should be clearly stated (i.e. patient, Internet professional, medical or health professional) Where appropriate, the qualification (i.e. MD, BSc) should be made clearly visible. Credential information must be displayed clearly on the home or "about us" or advisory board pages.
Author credentials related	Qualifications as a health care professional, or a personal site explaining an individual's quitting experiences
Means to determine currency	An indication of when the web site was last updated, i.e. copyright, "last updated", but does not apply to date automatically generated by the server (i.e. automatically generated dates stamp on the top of the page – "today is...").
Site current (within one year)	Evidence of a site update during the last year.
Relevant information presented	Accepted practices of smoking cessation; recommendations of herbal therapy, laser treatment, or acupuncture may be considered irrelevant as there is no scientific evidence for their effectiveness.
Content	
References Identified	Factual information will be contained in different sections of the web site, and includes information associated with smoking cessation such as risks of smoking, benefits of quitting, statistics on quitting, etc. A main statement of 'fact' (prominent piece of information) is accompanied by a reference to the source of evidence AND a source of evidence is linked to or listed in a biography or reference list at the end of the publication.
Peer reviewed and popular references identified	<u>Popular press</u> : newspapers or magazines or other web sites <u>Peer-reviewed literature</u> : journals, if unsure confirm at journal homepage or UBC library (www.library.ubc.ca) for information about that journal.
Identify opinions when making claims	Information not accompanied by references should be examined for consideration of a claim. If such claims exists, a statement qualifying that it is the opinion of the author and not based on fact should be included. Consider absurd claims. i.e. "proven results – quit smoking in 24 hours!"
Financial sponsor identified	A statement of funding, any financial material or in kind support provided by organizations or individuals towards the development or maintenance of a web site, will be displayed on the "About us" page or on a financial disclosure page.

Characteristic	Operational Definitions
Statement explaining financial conflict/bias	A statement of explanation includes reasons for accepting money or support from outside sources. Additionally, web sites should clearly identify advertising as a source of funding.
Disclaimer included	A disclaimer describes the limitations, purpose, scope, authority, and currency of the information. It should emphasize that content is general health information and not medical advice. Example, "The information provided is designed to support, not replace, the relationship that exists between a site visitor and health care professional."
Balanced and unbiased information	One bias will cancel any unbiased information presented. Balanced and unbiased information provides users with different cessation options, and will not appear to be only promoting a particular product.
Provide good health behaviour change information	A subjective decision of the quality of information based on the rater's knowledge of behaviour change and behaviour change theory.
Disclosure	
Privacy statement included	Site describes how confidential, private, or semi-private information, such as email addresses, email content, and exchanges will be used or treated. Note: This applies regardless of whether the site hosts patient records or stores any medical or personal information.
Purpose statement included	A statement of purpose displayed on the homepage or first link/click from the homepage
Interactivity	
Author contact information included	The web site displays a means of reaching the web site author, such as an email address or link, telephone number, or physical address
Moderated information exchange available	Information exchange may occur in the form of a bulletin board or chat room. <u>Moderator</u> : skilled professional trained in smoking cessation counselling, credentials of this person are clearly identified.
Design	
Site map available	Table of contents or 'map' of the pages available on the web site displayed on the homepage or tabs at the top or bottom of each page.
Search engine available	A query box is present on the page. The search engine aids specific word searching, and is displayed on the homepage, or search tab at the top or bottom of each page.
Search tools assist navigation	Tools such as a site map or search engine that aid the user in navigating the web site
Site easily navigable and organized	This is a subjective assessment of the ease of following the site.

Table 3-2: Description of Evidence-based Quality Criteria

Characteristic	Operational Definition
<p>Health and Social Consequences</p> <p>Acute risks identified</p>	<p>Several short-term risks are associated with tobacco use. Acute risks are the immediate effects of tobacco use. Some examples of acute risks are:</p> <ul style="list-style-type: none"> ▪ Shortness of breath ▪ Exacerbation of asthma ▪ Harm to pregnancy ▪ Impotence ▪ Infertility ▪ Increase of serum CO <p>Social issues around the declining acceptance of social tobacco use</p>
<p>Long-term risks identified</p>	<p>Smoking impacts all body functions. While there seem to be some health protective effects (e.g. protection from Parkinson's disease), there are many more health risks associated with smoking. Some examples of long term risks include:</p> <ul style="list-style-type: none"> ▪ Increased risk of: <ul style="list-style-type: none"> ▪ Cancer (including lung, oesophagus, bladder, kidney, stomach, pancreas) ▪ Chronic obstructive pulmonary disease ▪ Coronary heart disease ▪ Stroke ▪ Peripheral vascular disease ▪ Peptic ulcer disease ▪ Smoking during pregnancy increases the risk of: <ul style="list-style-type: none"> ▪ Spontaneous abortion ▪ Stillbirth ▪ Prematurity ▪ Low birth weight ▪ Sudden infant death syndrome (SIDS) ▪ Long-term disability and need for extended care
<p>Environmental risks identified</p>	<p>Exposure to environmental tobacco smoke (ETS) increases the risk of disease and disability in non-smokers.</p> <p>Passive exposure to ETS</p> <ul style="list-style-type: none"> ▪ Increases the risk of lung cancer, heart disease, and respiratory illness ▪ Increases the risk of SIDS and causes asthma and respiratory infections ▪ Can adversely effect toddler behaviour and interfere with cognitive and academic performance ▪ Increases the likelihood of a child becoming a smoker later in life

Characteristic	Operational Definition
Benefits of stopping smoking identified	<p>The Guidelines recommend clinicians ask patients to identify potential benefits of stopping tobacco use. Some benefits will occur immediately while others occur over a longer period of time. Some benefits include:</p> <ul style="list-style-type: none"> ▪ Improved sense of smell ▪ Food will taste better ▪ Saving money ▪ Improved self esteem ▪ Environment (home, car, clothing, breath) will smell better ▪ Healthier babies and children ▪ No worry about exposing others to smoke ▪ Perform better in physical activities ▪ Reduced wrinkling/aging of skin ▪ Health Benefits
Strategies for Quitting	<p>The Guidelines suggest that one component of aiding a patient in quit attempt is to help the patient establish a quit plan. A quit plan is a collection of strategies that the smoker may use to quit. The Guideline suggests that a quit plan be composed of the following:</p>
Suggests setting a quit date	Setting a quit date, ideally within two weeks
Suggests soliciting social support	Tell family and friends about quitting and request understanding and support
Suggests removing cigarettes from environment	Anticipate challenges to planned quit attempt, including nicotine w/d symptoms
Potential challenges to cessation identified	Remove tobacco products from your environment
Includes problem solving/skills training	<p>A second component in aiding a patient quit smoking is the provision of practical counselling (problem solving/skills training). Problem solving and skills training will address important issues facing the smoker in a quit attempt. It will address skills necessary to deal with abstinence, learning from past quit attempts, and how to anticipate triggers and challenges.</p>

Characteristic	Operational Definition
Includes withdrawal information	<p>Withdrawal is the process of ceasing to take an addictive drug. The severity and duration of withdrawal symptoms vary among individuals, but the symptoms are generally very unpleasant and frequently intolerable. Onset begins within a few hours of the last cigarette and includes an increased tendency to smoke, impaired cognitive function, and altered electrosurgical function. Most of these symptoms peak within 48 hours after the last cigarette and then gradually decline in intensity, but some symptoms such as craving for nicotine, increased appetite and impaired concentration may continue for several months or years.</p> <p>Other symptoms of nicotine withdrawal include craving, depression, anxiety, and difficulty in concentrating, dysphoria, increased appetite, insomnia, irritability, frustration, anger, restlessness and decreased heart rate.</p>
Provides appropriate pharmacotherapy information	Several different pharmacotherapies have been shown to be effective at increasing quit rates. Two of the most common include nicotine replacement therapy (NRT) and bupropion.
Strategies for maintenance and avoiding relapse	
Provides online support	As part of an attempt to assist quitting, the Guidelines recommend the provision of extra-treatment social support. On a web site, this may be the provision of supervised online support. Online support may include email inquiries, chatrooms, or bulletin boards. Online support should directly address behaviour/addiction problems rather than technical problems.
Provides external links/resources	The Guidelines suggest that clinicians provide supplementary materials to the patient. The Guideline suggests resources from federal agencies, non-profit agencies or local health departments addressing culturally/racially/ educationally/age appropriate information.

Characteristic	Operational Definition
	<p>The Guideline recommends that clinicians encourage patients in active discussion of the problems encountered or anticipated threats to maintaining abstinence (e.g. Depression, weight gain, alcohol, other tobacco users in the household) and describes potential responses. Some examples described are:</p> <ul style="list-style-type: none"> ▪ Negative mood/depression – prescription or referral to counselling. ▪ Strong withdrawal symptoms – prescription of the appropriate pharmacological interventions ▪ Weight gain – explain that weight gain of 5-10 pounds is common and appears to be self-limiting, ‘prescription’ of healthy diet and increased exercise. ▪ Flagging motivation/feeling deprived – explain that feelings are common, recommend rewarding activities, emphasize that beginning to smoke will increase urges and make quitting more difficult <p>A web site has limited ability to provide support and encourage; however appropriate information regarding relapse may be provided. Web sites should include information for seeking appropriate support, managing withdrawal, and weight gain.</p>
Includes strategies for maintenance and avoiding relapse	
Readability	
Easy to read	Flesch-Kincaid Grade Level Score < grade 7.

Chapter 4 – Results

4.1 Overview

The results demonstrate the variability of web site quality scores, and indicate total quality scores do not differ significantly between the search tools used to gain access to web sites. There appears to be a significant relationship between inclusion of evidence-based information and standard quality score; however, the evidence-based score does not appear to be a reliable predictor of the standard quality score.

4.2 Search Results

Table 3-2 details web site searching and selection results. The number of web sites retrieved using the specified search terms varied across Internet search tools, with Google yielding the greatest number of hits (5,350,000). A total of 728 web sites were screened for possible inclusion; upon initial review, 217 web sites met inclusion criteria. Upon further examination by web site evaluators, 67 of the web sites originally selected did not meet the inclusion criteria, and were excluded from evaluation. An additional 30 web sites were eliminated from the analysis because they were duplicates of other sites. (Although each web site was identified by unique URL address; several unique URLs were also associated with a common home page (linked to the same home page). In searching for web sites, the objective was to select 300 web sites; 100 web sites from each search tool. However, a lack of web sites meeting inclusion criteria limited the size of sample. In total, 120 web sites were evaluated and analysed for quality; 10 were retrieved through the private gateway, AllHealthNet.com, 38 were accessed through public gateways (Canadian Health Network and healthfinder), and 72 were accessed through the search engine, Google.

Table 4-1: Total Number of Web Sites Identified and Included

Search Tool	N - Web sites listed upon initial search	N - Web sites assessed for inclusion	N - Web sites selected	N - Web sites evaluated
Private Gateway (AllHealthNet.com)	400	334	24	10
Public (Canadian Health Network)	119	119	38	38
Public (healthfinder)	83	83	55	
Search Engine (Google)	5, 350,000	192	100	72
Total	> 5, 000,000	728	217	120

4.3 Research Question #1: Quality of self-help tobacco use cessation interventions available through the Internet

4.3.1 Total Quality Scores

Table 4-1 describes total quality scores for all of the web sites evaluated, and by the Internet search tool used to retrieve web sites. Total quality scores ranged from a minimum of 0.09 to a maximum of 0.92, with a mean score of 0.57. The web site with the highest total quality score was accessed via a public gateway, and that with the lowest total quality score was accessed through the privately-administered gateway. Sites accessed via public gateways had the greatest mean total quality score (0.63). Sites accessed via private gateways had the lowest mean total score (0.48), and also had the lowest minimum score (0.09) and lowest maximum score (0.78).

Table 4-2: Total Quality Score by Search Tool

Search Tool	N	Mean	SD	Median	Minimum	Maximum
All Sites	120	0.5664	0.1973	0.5664	0.0861	0.9206
Private	10	0.4805	0.2453	0.5446	0.0861	0.7794
Public	38	0.6339	0.1731	0.6485	0.28	0.9206
Search Engine	72	0.5427	0.1948	0.5275	0.0917	0.9086

4.3.2 Standard Scores for General Health Information

Table 4-2 describes standard quality scores for all of the web sites evaluated, and compares standard quality scores by the Internet search tool used to retrieve web sites.

Standard quality scores ranged from 0.1 to 0.91, with an overall mean of 0.58. The web site with the highest standard quality score was accessed through a public gateway, and the lowest was accessed through a private gateway.

Table 4-3: Standard Quality Score by Search Tool

Search Tool	N	Mean	SD	Median	Minimum	Maximum
All Sites	120	0.5819	0.1864	0.6237	0.1000	0.9105
Private	10	0.4709	0.2643	0.5059	0.1000	0.8350
Public	38	0.6632	0.1459	0.6526	0.2895	0.9105
Search Engine	72	0.5545	0.1796	0.5747	0.1095	0.8750

4.3.3 Evidence-based Scores for Tobacco Use Cessation

Evidence-based scores ranged between 0 and 1; the mean evidence-based quality score for all sites was 0.55. Web sites receiving a score of 1.0 were accessed through both public gateways and search engines. The web site with the lowest evidence-based score was retrieved through Google. Table 4-3 describes total evidence-based scores, and displays evidence-based quality scores by the Internet search tool used to retrieve web sites.

Table 4-4: Evidence-based Quality Scores by Search Tool

Search Tool	N	Mean	SD	Median	Minimum	Maximum
All Sites	120	0.5472	0.2802	0.5333	0.0000	1.0000
Private	10	0.4933	0.2814	0.4667	0.0667	0.8667
Public	38	0.5965	0.2680	0.6000	0.0667	1.0000
Search Engine	72	0.5287	0.2864	0.5333	0.0000	1.0000

4.4 Inclusion of Quality Criteria:

Web sites were assessed for the presence or absence of specific quality criteria; tables 8 and 9 compare the proportion of web sites which displayed each standard and evidence-based criterion.

4.4.1 Standard Criteria

Table 4-5: Inclusion of Standard Quality Criteria by Search Tool

Characteristic	All Sites		Private		Public		Search Engine		p-value
	n - yes	%	n	%	n	%	n	%	
Credibility									
Author Identified	108	90	7	70	37	97	64	89	0.1595
Author credentials identified	30	25	1	10	10	26	19	26	1
Author credentials related	29	24	1	10	10	26	18	25	1
Means to determine currency	96	80	7	70	33	87	56	78	0.3132
Site current (within one year)	54	45	4	40	18	47	32	44	0.8415
Relevant information presented	112	93	9	90	37	97	66	92	0.4182
Content									
References Identified	28	23	1	10	14	37	13	18	0.0372
Peer reviewed and popular references identified	21	18	1	10	8	22	12	17	NA
Identify opinions when making claims	11	9.2	1	10	3	7.9	7	9.7	NA
Financial sponsor identified	74	78	7	70	34	89	53	74	0.0826
Statement explaining financial conflict/bias	4	3.3	1	10	0	0	3	0.42	NA
Disclaimer included	73	61	6	60	24	63	43	60	0.8378
Balanced and unbiased information	101	84	8	80	37	97	56	78	0.0055
Provide good health behaviour change information	58	48	3	30	24	63	31	43	0.0705
Disclosure									
Privacy statement included	71	59	5	50	25	66	41	57	0.4173
Purpose statement included	110	92	7	70	38	100	65	90	0.0933
Interactivity									
Author contact information included	107	89	7	70	36	95	64	89	0.4891
Moderated information exchange available	5	4.2	0	0	1	2.6	4	5.6	NA
Design									
Site map available	109	91	7	70	35	92	67	93	1
Search engine available	59	49	4	40	26	68	29	40	0.0087
Search tools assist navigation	97	81	4	40	34	89	59	82	0.4088
Site easily navigable and organized	105	88	7	70	36	95	62	86	0.2118

4.4.1.1 Credibility

A credible web site offers reasonable grounds for being believed; criteria to assess site credibility included information on the source and currency. The majority of sites identified the name of the author (90%); however few sites listed the author's credentials or qualifications (25%), or were written by an individual or organization with related credentials (22%). 80% of all sites provided a means to determine the currency of the site; 45% were

still current (updated within the past year), and 93% of all sites posted relevant information related to tobacco use cessation.

4.4.1.2 Content

Content refers to the type and quality of the information provided; components assessed included accuracy, as judged by presence of reference information; presence of a disclaimer; and completeness. Less than one quarter (23%) of web sites reviewed provided a means to verify factual information through footnotes or bibliographies. When web sites listed reference sources, most often references from both the popular press and peer-reviewed literature were included (21/28, 75%). The majority of sites did not make claims (75%); however, when claims were made, few sites clarified that claims made were the authors' opinions (11/30, 37%).

Slightly less than two thirds (61%) of all sites provided a disclaimer describing the limitations of the information posted on the sites. In most cases, web site reviewers were able to determine who paid for or sponsored the site (78%). Financial conflict or bias was unapparent on most sites (79%); when biases were present, most often there was no statement of explanation (21/25, 84%).

The majority of sites under review published balanced and unbiased information (84%); these sites presented a variety of options and resources to support cessation attempts, and did not appear to be promoting one particular product. In contrast, only 48% of web sites provided good health behaviour change information, as judged by the application of behaviour change theories.

4.4.1.3 Disclosure

Full disclosure allows consumers to adequately understand the intent of the organization providing information and enables informed decision making. Components of disclosure include a description of the web site purpose, and procedures for collecting personal information about users. The majority of web sites presented a purpose statement or description on the start page (unique URL) (92%). Almost two thirds (59%) of the web sites reviewed included a privacy statement; a description of the manner in which confidential, private, or semi-private information, such as email addresses and email content, would be treated.

4.4.1.4 Interactivity

For a web site to be considered “interactive” the presence of an interface for communicating with the web site provider and other users is required; an interactive interface may include feedback mechanisms or an ability for the user to communicate with others. The majority of web sites provided authorship contact information through email, telephone or postal addresses; 64% of sites included at least two or all three means of contact, whereas 25% provided only one of the above mechanisms. In most cases, no information exchange between users was available (82%). Where information exchange was available (n=22), the content on five sites was reported to be monitored by a skilled professional trained in smoking cessation counselling.

4.4.1.5 Design

Design refers to the layout of the web site and presence of links to external information. Design does not necessarily affect the quality or accuracy of information, but

good design is important for ensuring effective delivery and usability of the information presented. Components of design evaluated include navigability and internal search capacity. Most often web sites provided a site map (91%) and slightly less than half (49%) included a search engine feature. Reviewers judged the search tools provided for their contribution to site navigation; the majority of all sites were deemed to provide useful search tools, and sites were easily navigable and presented in an organized manner (81% and 89%, respectively).

4.4.2 Evidence-based Quality Criteria

The majority of web sites reviewed in this study contained at least some of the recommended informational content for self-help interventions for treating tobacco use (30;83).

Table 4-6: Inclusion of Evidence-based Quality Criteria by Search Tool

Characteristic	All Sites		Private		Public		Search Engine		
	n - yes	%	n	%	n	%	n	%	
Health and Social Consequences									
Acute risks identified	67	56	4	40	26	68	37	51	0.1063
Long-term risks identified	92	77	7	70	32	84	53	74	0.2399
Environmental risks identified	72	60	4	40	30	79	38	53	0.0078
Benefits of stopping smoking identified	91	76	7	70	32	84	52	72	0.2376
Strategies for Quitting									
Suggests setting a quit date	75	62	7	70	28	74	40	56	0.0678
Suggests soliciting social support	78	65	7	70	27	71	44	61	0.4022
Suggests removing cigarettes from environment	65	54	6	60	20	53	39	54	1
Potential challenges to cessation identified	78	65	6	60	26	68	46	64	0.6783
Includes problem solving/skills training	60	50	4	40	20	53	36	50	0.8427
Includes withdrawal information	39	32	2	20	12	32	25	35	0.8332
Provides appropriate pharmacotherapy information	41	34	2	20	14	37	25	35	0.8368
Strategies for maintenance and avoiding relapse									
Provides online support	24	20	1	10	5	13	18	25	0.2174
Provides external links/resources	100	83	8	80	32	84	60	83	1
Includes strategies for maintenance and avoiding relapse	57	48	6	60	18	47	33	46	1
Readability									
Easy to read	46	38	3	30	18	47	25	35	0.2218

4.4.2.1 Health and Social Consequences of Smoking

Many sites presented the risks of smoking cigarettes; 92% of all sites described long term risks, 67% of all sites posted information on acute risks, and 72% of sites presented information regarding the environmental risks associated with smoking cigarettes. The majority of all sites (91%) also described the benefits of stopping tobacco use.

4.4.2.2 Strategies for Successful Quitting

The US Clinical Practice Guidelines for Treating Tobacco Use and Dependence recommend physicians discuss four specific strategies for quitting when advising patients; 1) setting a quit date, 2) enlisting social support, 3) removing tobacco products from the environment, and 4) anticipating challenges to a planned quit attempt (83). The majority of

web sites included such information; 75% of all web sites reviewed recommended users set a quit date, 78% of sites included both information on soliciting social support and anticipating challenges to a quit attempt. Approximately two thirds of all sites reviewed (65%) recommended users remove tobacco products from their environments.

Other recommendations include provision of practical counselling (problem solving/skills training), discussion of withdrawal symptoms and possible coping techniques, and referring patients to appropriate pharmacologic interventions. More than half of all sites (60%) evaluated provided practical counselling such as problem solving/skills training, yet fewer than half of web sites included information on coping with withdrawal and withdrawal symptoms (39%), or displayed accurate information regarding pharmacological treatment (41%).

4.4.2.3 Strategies for Maintenance and Avoiding Relapse:

Although all sites provided links or references to external resources (100%), few provided supervised online support (24%). Slightly more than half (57%) of all web sites reviewed presented strategies for successful maintenance and avoiding relapse.

4.4.2.4 Easy to Read

In 1990, the US National Cancer Institute recommended self-help cessation interventions should be easy to read; their recommendations suggested no materials should be developed with more than a seventh grade reading level. The majority of web sites evaluated were not considered to be "easy to read"; only 46% of all sites presented information lower than a seventh grade reading level.

4.5 Research Question #2: Comparing the quality of web-based tobacco use cessation interventions according to Internet search tool

4.5.1 Comparison of Web Sites Including Specific Criteria

Fisher's Exact Test Statistics were calculated to test the association between inclusion of quality criteria and the search tool used to access web sites. Due to the small sample of web sites accessed through private gateways, comparisons were made between sites accessed through public gateways and search engines only. Because sites indexed by public gateways are reviewed by human editors, it was expected such web sites would be more likely to include each of the standard and evidence-based criteria. Probability values for each comparison are reported in Tables 4-5 and 4-6.

4.5.1.1 Inclusion of Standard Quality Criteria

Few differences exist between search engines and public gateways in the proportion of sites which included standard quality criteria. Sites accessed through search engines and public gateways were equally likely to include each of the criterion addressing content (Table 4-4).

Regarding content of information, there were no significant differences in the proportion of web sites including a disclaimer or providing good health information. However, identification or references (0.04) and provision of balanced and unbiased health information (0.01) differed from chance alone as a function of the type of search tool.

There were no significant differences between search tools in the proportion of sites including criteria related to disclosure or interactivity. Few differences existed in the proportion of sites including design features. Sites accessed through search engines and public

gateways were equally likely to post a site map; however, public gateways more often included a search engine ($p=0.01$).

4.5.1.2 Inclusion of Evidence-based Quality Criteria:

Inclusion of evidence-based quality criteria was very often similar between the search tools, Google and publicly-administered gateways. Web sites were equally likely to include information on acute risks and long-term risks associated with smoking cigarettes. There were no significant differences in the proportion of web sites including information on the benefits of stopping tobacco use ($p = 0.23$). However, the proportion of web sites detailing the environmental risks of smoking differed from chance alone as a function of the type of search tool ($p=0.01$).

The proportion of sites including information about setting a quit date, problem solving skills, withdrawal, and pharmacotherapy information was similar. Inclusion of online support and maintenance information did not differ from chance alone as a function of the type of search tool.

Sites accessed through public gateways and search engines were equally likely to include recommendations to remove tobacco products from the environment and anticipate challenges to a quit attempt. There were no significant differences in the proportion of web sites providing external links or resource information, and both groups of sites were equally likely to be easy to read. Table 4-5 details statistical relationships.

4.5.2 Comparison of total quality scores across search tools

A one-way analysis of variance (ANOVA) was conducted to determine the effect of search tool on total quality score. Mean total scores differed significantly across the three

Internet search tools ($p = 0.02$). Post-hoc comparisons were conducted using Bonferroni correction did not detect a difference in total quality scores between the three search tools ($p > 0.01$).

A one-way ANOVA was also conducted to determine the effect of search tool on standard quality score. Mean standard quality scores differed significantly across the three Internet search tools (0.002). Post-hoc comparisons were conducted using Bonferroni correction to compare mean standard quality scores between search tool pairs. Results of the pair wise comparisons indicated there was a statistically significant difference in standard quality scores between 1) private and public and 2) public and search engines. There was no statistically significant difference in score between private and search engines. Thus public gateways appeared to have had significantly different standard scores than the other two search tools.

Finally, a third ANOVA conducted to determine the effect of search tool on evidence-based quality score. Mean evidence-based quality scores did not differ significantly across the three Internet search tools ($p = 0.40$).

4.6 Research Question #3: Relationship between standard evaluation criteria and evidence-based criteria for web-based tobacco use cessation interventions

Pearson correlation coefficients and scatter plots revealed a positive association between standard quality score and evidence-based quality score ($r = 0.51$). Simple linear regression analysis was conducted to further examine this relationship, and to estimate the value of the evidence-based score in predicting standard quality scores. Linear regression analysis revealed that evidence-based score was a significant ($p < 0.1$) predictor of standard score, and accounted for 26% of the variance in evidence-based score. ($R^2 = 0.26$).

Chapter 5 - Discussion

5.1 Chapter Overview

This chapter provides a discussion of the results of the study, and compares the findings to relevant literature. Implications of these findings are discussed in relation to consumers, health practitioners and policy makers, and researchers. Limitations of the current study are described; the chapter concludes with suggestions and considerations for future research and practice.

5.2 Review of findings

5.2.1 Quality of self-help tobacco use cessation interventions available through the Internet

This research aimed to determine the quality of a sample of self-help tobacco use cessation interventions available through the World Wide Web. As with other studies examining self-help tobacco use cessation interventions (18;19;67), the quality of web sites reviewed was determined to be extremely variable, ranging in score from 0.09 to 0.92. The search queries employed on three different search tools resulted in the evaluation of 120 web sites; the mean total score was 0.57. Not one site included all of the criteria assessed; although several included many of the recommended elements of an effective self-help smoking cessation program (30;83).

The mean standard quality score for all sites was 0.58. Most often sites included a purpose statement (92%) and presented relevant information (93%). This finding may be due, in part, to the inclusion criteria employed to select web sites; only those sites purporting to provide self-help tobacco use cessation interventions were included. The majority of sites

identified the author or organization publishing the site (90%); however, few identified authors' credentials (25%). These findings are consistent with other studies of online health information, and those specifically related to smoking cessation interventions. Ademiluyi and colleagues (67) also identified the majority of web site owners (98%). In the current study, authors' credentials were identified and related in only one quarter (25%) of the sites reviewed, whereas Cheh reported 63% of the sites reviewed were authored by organizations with health-related credentials {Cheh, 2003 15 /id}. The majority of web sites reviewed provided a means to determine currency by presenting a date of copyright or last update (80%); however, less than half were updated in the year preceding the evaluation (45%). This finding is similar to Cheh where only 60% of the 30 sites reviewed displayed a copyright date.

Few sites provided references or identified claims as opinions. Thus, consumers may be unable to verify information, and risk accessing and relying on outdated information. Although the majority of sites provided balanced and unbiased information (84%), only half (48%) provided what was judged by the reviewers to be "good health behaviour change information."

Despite the potential of the Internet to provide an interactive, customized experience, few sites included interactive features. Only five of the sites reviewed (4.2%) provided information exchange options moderated by health professionals (i.e. discussion board or chatroom). In another study of smoking cessation information, only 11% of the 46 sites reviewed provided interactive features (19). These findings suggest online interventions are not maximizing their potential to provide tailored, interactive interventions, despite evidence suggesting the effectiveness of such interventions (85).

Of significant concern is the large proportion of web sites that failed to present information below a seventh grade reading level, as recommended by the National Cancer Institute (30). The mean Flesch-Kincaid Reading level of all web sites was determined to be Grade 8.7, and only 35% of all sites evaluated presented information that was judged to be easy to read. These results are very similar to the findings of other studies, in one study (N = 46), the mean reading level was found to be 8.8, and another concluded 90% of sites (N = 30) presented material above a grade 6 reading level (18).

A survey of adult literacy in Canada found that almost half (48%) of adult Canadians have low literacy skills, and therefore, do not have adequate reading abilities to manage most everyday reading requirements (86). Literacy rates are especially relevant to the design and implementation of self-help smoking cessation interventions; many of the same groups within the general population that tend to have low literacy skills also tend to have the highest rates of smoking (87). Web sites with high reading levels may deepen the digital divide, and render a potentially beneficial resource inaccessible.

Variations in overall quality and a lack of evidence-based web sites demonstrate the need for caution when accessing or recommending online tobacco use cessation interventions. Many sites failed to include criteria deemed to be important for quality and essential for an effective tobacco use cessation intervention; thus, the risk is high that when searching for tobacco cessation information consumers will encounter information of questionable quality. Additionally, high reading levels may prevent access at the most basic level. Thus, despite the potential of the Internet to provide usable and accessible information, consumers (and health practitioners) may have trouble distinguishing among quality web sites when seeking tobacco dependence treatment through the Internet.

5.2.2 Comparing the quality of web-based tobacco use cessation interventions according to Internet search tool

Several previous studies demonstrated that poor quality of health information is pervasive on the World Wide Web; however, it has also been noted that accurate and credible information is available (15). In efforts to guide consumers to useful information, initiatives such as specialised search tools or gateways were developed. Unlike search engines which automatically index web sites, gateways employ human editors to review and index sites meeting specific quality criteria; theoretically providing consumers with access to credible and accurate information more efficiently. Despite the investment in gateways by private enterprise and government, few studies compared the overall quality of sites between different search tools used to access web sites. The present study compared the quality of web-based, self-help tobacco use cessation interventions across three different Internet search tools, 1) a search engine, 2) publicly-administered gateways, and 3) a privately-administered gateway. The findings demonstrate that total quality scores do not differ significantly between search tools.

Research examining information on osteoarthritis found that the information retrieved through medical search engines was of significantly higher quality than general search engines (88). In this study, it was also expected there would be significant differences in the quality of sites based on the search tool used; it was hypothesized that quality of sites available through publicly-administered gateways would be higher due to the rigorous editorial process employed to select and index sites. However, such differences were not found to exist. These findings are similar to a study of the quality of androgen deficiency information in the aging male; the authors reported no difference in quality of web sites

between general and medical search engines when judged against standard and evidence-based criteria (89). It may be that differences in quality are due to the type of information presented, rather than the tool used to access sites. When the evidence is clear, medical search engines appear to be meeting their goal of filtering the Internet to retrieve less but more valid information. In contrast, when a definitive evidence-base is lacking, search engines appear to be less likely to retrieve relevant web sites providing high quality information. However, this rationale does not explain the current findings.

Despite a strong evidence-base regarding better practices for tobacco use cessation interventions (83), there was no difference between quality scores across search tools. It may be that efforts between search engines to compete for market share influence the quality of web sites retrieved, and ultimately benefit consumers in their searches for online health information. Consumers are loyal web surfers; in a qualitative study of Australian Internet users, Google was undoubtedly the search engine the majority of participants used most and preferred (90). Search engine companies invest in searching technologies in order to provide the most relevant and useful site listings, and retain "customers."

These findings are important for both promoters and investors in publicly administered gateways to consider. Although overall quality scores were the same between search engines and public gateways, fewer sites were retrieved through public gateways; and thus, access to information may be more efficient. Additionally, public gateways were more likely than search engines or privately-administered gateways to include standard criteria information. However, research on searching behaviours indicates few consumers use (public or private) gateways when searching for health information. In a study of how consumers search for and appraise health information (80), none of the participants used medical portals

as a starting point for their searches. Consumers may be unaware of the existence of public-gateways, and their potential to aid searching and access to information.

It may also be important to consider developing collaborative relationships between search engines and publicly-administered gateways. Through such a relationship, search engines may be able to develop automatic indexing criteria, thus freeing resources to promote the online gateway, expert review, and better access for consumers to information.

5.2.3 Relationship between standard evaluation criteria and evidence-based criteria for web-based tobacco use cessation interventions

Although variations of standard criteria have been employed to measure quality of health information available through the Internet, few studies examined the association between standard criteria and the inclusion of evidence-based information. This study indicates a positive relationship between the two types of criteria exists, and suggests standard criteria, to some degree, are able to predict the presence of evidence-based information ($R^2 = 0.26$) presented on a web site. Scoring systems and evaluation criteria may be somewhat useful in predicting quality of information as measured by evidence-based guidelines; however, assessment of the proposed criteria does not guarantee access to accurate content. These findings provide a good starting point for further research into the predictive value of standard quality scores; further research is required to identify other variables or unique factors that will be useful to guiding consumers to accurate and useful Internet content.

Further consideration of the criteria proposed to measure quality is also necessary due to the lack of a valid, reliable, and user-friendly method for scoring web sites. As such, it is important to examine both the definition of "quality" and the criteria used to measure it.

Although total quality scores did not differ between search tools, standard quality scores were

found to differ significantly between the three groups, with publicly-administered gateways receiving the highest scores. Additionally, sites accessed through public gateways were more likely than those accessed through a search engine to include reference information, include a search tool within the site, and to provide balanced and unbiased information.

5.3 Interpreting Quality

Quality of health information may be defined in many ways, and is often determined by the individual viewing the content. In this study, quality was measured by the presence or absence of certain criteria deemed to be essential for quality. However, quality may also be judged according to behavioural outcomes or change, including the web site's ability to motivate or change smoking behaviour in an individual. In the absence of knowledge about a particular health topic, a user's perception of quality may depend on his or her ability to assess the information presented, and his or her needs at a given time (91). For example, a web site may include all of the essential elements for an effective intervention; however, if unable to read and comprehend the information, the user is likely to judge the site as poor quality.

Scores are often developed and compared to a standard to indicate varying degrees of quality. However, in this study, and others in the literature, there is no standard upon which to judge the level of quality. Total quality scores reflect a comparison of "quality" across sites rather than a true indication of the utility or "quality" of the content presented.

There is a strong emphasis on evidence-based medicine and decision-making in health care; however, the "best" evidence is often subjective, situation-specific, and constantly changing (92). Although evidence-based criteria used in this study are based on the "best"

available evidence, consideration of the level of evidence and limitations associated with evidence are necessary when judging quality.

In this study, criteria used to judge evidence were based on recommendations made by the NCI for essential elements of self-help smoking cessation programs (30) and U.S. Clinical Practice Guidelines for Treating Tobacco Use and Dependence (83). Although there are many studies that address smoking cessation, there is not sufficient research evidence to support a definitive answer to what mix of program elements will “cure” the addiction. In the absence of research evidence, a combination of the “best” available evidence from a variety of research designs and clinical expertise have been used to make recommendations for interventions.

The NCI recommendations and Clinical Practice Guidelines are based on a combination of available research and an Advisory Panel’s answer to the question, “What are the essential elements of self-help/minimal interventions strategies for smoking cessation?” For example, Clinical Practice Guidelines classify the strength of evidence using three levels; Level A evidence results from multiple, well-designed clinical trials yielding a consistent pattern of findings. However, in the absence of relevant randomized control trials, Level C recommendations are made based on expert consensus (Level C). In applications of the Clinical Guidelines, including the current study, the recommendations are treated equally without regard to the “level” of the evidence.

Additionally, the lack of a strong relationship between evidence-based and standard quality criteria prevents judgement of the level of informational quality based on standard scores only. Proposals to evaluate standard quality criteria were designed to indicate the overall quality of a web site (16; 53); however, it is possible for a web site author to include many of the standard criteria on a web site, and fail to include accurate or evidence-based

information. Assessment of the inclusion of standard quality criteria is not a measure of quality of informational content; but rather a measure of specific characteristics related to the level of quality of the delivery medium or "package." Web entrepreneurs may be aware of suggested criteria, and are able to present misinformation, while including many of the recommended characteristics.

When examining a web site, one may consider the adage, "You can't judge a book by its cover." The cover may be visually appealing, present the author's name, and oftentimes includes testimonials describing the "quality" of the content; however, the cover provides very little evidence regarding the quality of the content of the book. Similarly, basing a judgement of the quality of a web site on standard criteria neglects an assessment of the evidence, or the informational content. Standard criteria measure superficial characteristics, which may be unrelated to the accuracy of the informational content.

5.4 Implications

5.4.1 Implications for Smokers Searching for Cessation Information through the Internet

As the Internet grows, users will continue to face challenges accessing and judging online health information. In the absence of a set of reliable, valid, and usable criteria for evaluating web site content, smokers, and other consumers, searching for smoking cessation information must be educated regarding the capabilities of the tool and the variability of information available. Most often those seeking online information are unable to judge the accuracy of the content presented, and may also have difficulty assessing the credibility of a web site author.

Additionally, they must be made aware of the potential risks and necessity of reviewing web sites with a healthy scepticism. Despite these risks, consumers can be reassured that accurate, useful, and reliable information is available, reminded of the benefits and potential of interactive health communications, and if possible, directed to evidence-based, effective web sites.

Although searching for tobacco use cessation information through a public gateway does not guarantee access to a complete and evidence-based web site, searching for information through a public gateway may be more efficient. Fewer sites are indexed; therefore, users are required to spend less time searching and filtering information, and may spend more time investigating the information posted on the web site. Although overall quality scores did not significantly differ, it is unadvisable to utilize privately-administered gateways. In this study, few of the indexed sites were available for review, and many lacked evidence-based content. Research suggests web users are more likely to use search engines rather than gateways when searching for medical information (80;93); thus, it will be important to educate smokers seeking information regarding the availability and benefits of publicly-administered gateways.

5.4.2 Implications for Health Practitioners

Consumers often rely on health practitioners, such as physicians, pharmacists, and nurses to direct them to behaviour change information. Health practitioners must be made aware that evidence-based tobacco use cessation interventions are available through the Web, and that content is variable and effectiveness of these programs uncertain. Given the current findings, it is advisable that when asked, health practitioners recommend specific sites to consumers.

Such practices are being promoted and managed by some health care organizations (<http://www.informationtherapy.org/>); credible web sites are prescribed to patients in the course of their consultations with health care providers in the form of “information therapy.” The Center for Information Therapy describes information therapy as the “timely prescription and availability of evidence-based information to meet individuals’ specific needs and support decision-making,” and expects that information prescribed by licensed professionals will soon be recognized and paid for within government and health plan reimbursement formulas (94).

Until the efficacy of such systems is known, it is important for health practitioners to be aware of the type of information available, and be prepared to make recommendations for information based on their own judgements and knowledge of the evidence. Table 5-1 provides a list of the highest rated web sites in this study, which could be recommended to smokers seeking tobacco use cessation information. The author cautions, however, that the effectiveness of interventions is unknown, and encourages practitioners to consider the potential user’s comfort with the Internet and other potential adjuncts to smoking cessation support, such as telephone support lines and/or nicotine replacement therapy.

Table 5-1: High Scoring Web Sites

URL	Web site Name	Total Score
http://www.cdc.gov/nccdphp/aag/aag_osh.htm	Chronic Disease - at a glance - tobacco	0.92
http://quitplan.quitnet.com/qn_main.html?ref=	Quitnet - Quit smoking altogether	0.91
http://www.smokefree.gov	smokefree.gov	0.89
http://www.cancer.org/docroot/PED/content/PED_10_13X_Quitting_Smoking.asp	ACS: Quitting Tips	0.88
http://www.quitnet.com/library/guides/NRT/Index.html	Medications for Quitting Smoking	0.88
http://www.cdc.gov/tobacco/	TIPS - CDC	0.86
http://www.cdc.gov/tobacco/how2quit.htm	How to Quit	0.86
http://www.stopsmokingcenter.net/	The Stop Smoking Center: An interactive smoking cessation program and professionally moderated	0.84
http://www.habitrol.com/	The Habitrol Support Program	0.83
http://www.sk.lung.ca/content.cfm/cessation	Smoking Cessation - Lung Association of SK	0.83
http://www.hc-sc.gc.ca/hecs-sesc/tobacco/quitting/ontheroad/	On the Road to Quitting	0.83
http://familydoctor.org/177.xml	Smokeless Tobacco: Tips on how to stop	0.82
http://www.ahrq.gov/consumer/helpsmok.htm	Help for smokers: ideas to help you quit	0.82
http://my.webmd.com/medical_information/condition_centers/smoking_cessation/default.htm	Smoking Cessation: Information from WebMD	0.81
http://www.ahcpr.gov/consumer/smokecsm.htm	You can quit smoking: consumer information	0.78
http://www.hc-sc.gc.ca/hecs-sesc/tobacco/youth/quit/quit.html	Quit4Life: Health Canada for Youth	0.77
http://www.joechemo.org/	Joe Chemo: A Camel who wishes he had never smoked	0.76
http://www.ayn.ca/quit/en/home.asp	A tribe Called Quit	0.76
http://www.lung.ca/smoking/	Smoking and Tobacco	0.76

Due to the ever-changing nature of the Internet and effort required to review sites for evidence, it may be unfeasible for health practitioners to remain current on the type and quality of tobacco use cessation information available through the World Wide Web. In the absence of information regarding specific web sites and valid and reliable tools for assessing quality of content, findings from this study indicate it is reasonable to recommend consumers and health practitioners use the publicly-administered gateways, healthfinder and the

Canadian Health Network, when searching for such information. When making decisions in the absence of evidence, a better practices model is often applied. Although little evidence exists regarding the effectiveness of web sites in changing tobacco use behaviours; web sites accessed through publicly-administered gateways were more likely to include standard quality criteria for credibility, content, disclosure, and interactivity. Evidence-based criteria are not reviewed; however, because sites indexed via publicly-administered gateways are reviewed by human editors it is also reasonable to expect harmful information would be filtered.

Previous reports suggest the tobacco use cessation information is accurate, but difficult to find (19). Publicly-administered gateways index fewer sites; theoretically improving the odds of finding usable information. In this study, the search query yielded over five million hits through Google compared to only 202 yielded by healthfinder and the Canadian Health Network. Additionally, the most highly rated sites were more often found through publicly-administered gateways rather than the search engine. Although not significantly different, information is more easily accessible.

The findings should also be considered by health practitioners when developing interventions for dissemination through the Internet. Although criteria may vary, it is essential to consider perceptions of quality and design web sites accordingly. Accurate information and supporting references must be presented so that users may verify the information, and text written at a reading level accessible to the majority of the population.

5.4.3 Implications for Policy and Decision Makers

The findings of this study suggest quality of tobacco use cessation intervention web sites does not differ according to the search tool used to access web sites. Given these findings, it is not surprising to learn that Web users don't often use gateways when searching

for online health information (80;91), and leads one to question the value of the investment and allocation of funds to publicly-administered gateways. Between 1999 and 2002, \$33 million was dedicated to the Canadian Health Network (http://www.tbs-sct.gc.ca/rma/account/sufa-ecus/chi-ics_e.pdf); however, no formal evaluation of the resource has been published. Policy and decision makers must examine whether gateways are achieving the goal of enabling access to credible, practical information related to health promotion and disease prevention, and consider possibilities for evaluation.

Decision makers should also consider the criteria currently used to index sites. The Canadian Health Network examines web sites for characteristics of credibility, usability, relevance, disclosure, currency, and appropriateness of content; however, the findings of this study indicate these criteria may be less than adequate to identify evidence-based and accurate information on the Web. An expert review of content prior to indexing Web sites would ensure high quality standards. As more evidence becomes available regarding the effectiveness of online tobacco use cessation interventions, it will be important to include links to these sites also.

5.4.4 Implications for Research

Studies assessing the “quality” of online health information are pervasive in the published literature; however, despite the time and effort dedicated to evaluate web sites, measures are used inconsistently between studies, and a definition of quality remains elusive. Although most authors agree on key criteria, no usable and reliable tool exists for web users to judge the content of online health information. Findings from the current study question the validity of proposed criteria to measure quality of evidence, and the utility of filtering tools to guide consumers to adequate sites. Additionally, the evidence measuring the effectiveness of

web site interventions to change behaviour is lacking. In the absence of standard set of criteria to judge web site content, study into the effectiveness of web sites affect on behaviour, and investigation into overcoming challenges associated with Web-based research are essential.

Studies of web-assisted tobacco use cessation interventions have begun to demonstrate their promise; however, the evidence is limited regarding their effectiveness. In part, the environment of Web-based research presents several methodological challenges. Although recruitment of potential study respondents extends across geographical and cultural boundaries (95), online researchers are faced with issues such as, difficulty assigning participants to control groups, selection biases related to the digital divide, and high attrition at follow-up (96;97). Innovative research designs and high standards will help to prevent dissemination of unproven interventions and to provide effective programs to smokers seeking information.

5.5 Limitations

There are several important limitations to consider when interpreting the results of this study. Firstly, the nature of the Internet presents several limitations.

The Web is dynamic medium; thus, both the sites available and content within the sites are expected to change periodically. Web sites that did not exist at the time of this review may include more of the criteria deemed necessary for quality, while some of the sites reviewed in this research may no longer exist. An attempt was made to control for the dynamic nature of the Internet by employing web-recording software; however, the software did not perform as expected and web sites were reviewed online. The results presented here represent a “snap shot” of the content of information available during the period of time of review.

The structure of the Internet and search technologies prevented a random selection of web sites to review. Although a methodological challenge to consider, it does not affect the validity of the results, because a random selection of sites is unlikely to be representative of the sites most often accessed by consumers.

Only one search engine (Google) was employed. Because search engines have different indexing criteria, it is possible that a different list of sites may have been retrieved and quality scores differed if another search engine was included. However, the aim of the search strategy was to approximate what a consumer may experience; studies suggest consumers are likely to use Google over other search engines, and often only employ one search engine in a search query (91).

The number of web sites indexed on both the private and public gateways resulted in a smaller sample size than originally expected. For the private gateway, small sample sizes prevented statistical comparisons between all sites for the inclusion of certain criteria. However, despite the inability to make statistical comparisons, the small sample is indicative of the lack of information available via the private gateway, Allhealthnet.com. Although quality scores appear to be similar, the current findings indicate private gateways are not useful sources of tobacco use cessation interventions information.

The definitions of a web site and web page are used inconsistently in the literature. For this study, web sites were defined according to the URL addresses; however, unique URLs were related and thus, eliminated from the analysis (scores were the same due to links to the same information). Although accounted for in the analysis, it is possible that important information was missed because sites were not included.

The study was designed to mimic possible Internet search behaviours; however since the research was not a naturalistic observation of actual smokers searching for tobacco use

cessation, it is not possible to draw conclusions about what consumers actually encounter. It is possible that sites reviewed are not an accurate representation of what people encounter; however, search query was more inclusive than exclusive, and attempts were made to be comprehensive.

There is some concern that search results may be biased according to the geographic location of the search; research suggests that Internet content has a geographic bias towards American content (98). To address this potential limitation, a search was conducted on Google using the query, "quit smoking" in the cities of Toronto, Ontario, Vancouver, British Columbia, and Alexandra, New Zealand. Search results were similar according to the search location, yielded similar numbers of results, and listed sites originating in the U.S., Canada, and Australia.

Furthermore, the results of this study are not generalizable to health information beyond tobacco use cessation interventions. Evidence-based criteria used to measure quality of tobacco use cessation interventions are not congruent with measures for other types of health information. However, given similar findings in other studies examining the quality of online smoking cessation information (67); (19); (18), study results may be representative of what would be found online today.

Finally, the study was limited to the evaluation of the quality of the information posted on the Internet, rather than the effect of online interventions to change behaviour. Data on effectiveness is limited; thus, results must be interpreted and web sites recommended with caution.

5.6 Conclusions

Dissemination of tobacco use cessation information through the World Wide Web has the potential to reach, motivate, and treat a large population of smokers, and may offer several benefits to more traditional delivery devices. This study examined the content of tobacco use cessation interventions available through the Internet, and was the first to investigate the comparability of Internet search tools to yield high quality, evidence-based tobacco use cessation information. The results suggest the proportion of web sites which include evidence-based content is variable, and publicly-administered gateways do not differ from privately-administered gateways or search engines in the type of information that is retrieved. These findings suggest that the utility and effectiveness of standard "quality" criteria, such as authorship, credibility and currency are not adequate indicators of informational content. A combination of current "standard criteria" (e.g., authorship), and evidence regarding content and effectiveness of the intervention are all needed to judge the quality of websites. This will require an understanding of health behaviour, information technology, and communication. Thus, a multidisciplinary approach is required to develop an effective method for judging the quality of smoking cessation websites. Furthermore, there is a lack of information regarding Web-assisted tobacco use cessation interventions; research is needed to understand the effectiveness of such interventions, and appropriate methods for promoting interventions to consumers.

It is hoped that the findings of this study will assist and challenge consumers, health practitioners, policy-makers, and researchers to further develop practices, policies, and technologies to better support smokers seeking information and access to useful and reliable tobacco use cessation interventions through the World Wide Web.

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Appendix 1 – Description of Search Tools

Search Engine – Google

The search engine Google (www.google.ca) was used. Google is a major search engine with an index of over four billion pages, likely to yield dependable results and provide a comprehensive record of the material available. Google is the most popular search engine available through the Web, performing approximately 250 million searches per day (71) or 55% of all searches on the World Wide Web (72). Google was voted most outstanding search service by Search Engine Watch subscribers three years in a row, and in 2002 won individual categories for best design, best search feature (spell check), and best images search engine (73). Additionally, Google provides the main search results for several other popular search engines, including AOL, Yahoo, and Netscape (a search conducted using AOL would yield the same results as the same search conducted at Google.com).

What is a Search Engine?

A search engine is a database of web sites compiled by software programs called crawlers, robots or spiders. Crawlers visit web sites collecting page addresses (URLs) and capturing the words displayed on the pages. Indexing software catalogues web site information, including the web page address, the position of words on the page and presence of links, to form a database of web site listings. Interrogation software is the interface between the database and the user, and enables users to retrieve specific web pages, by searching for individual words and phrases (99). Maintaining a search engine is a continuous and automatic process; crawlers visit web sites regularly and thus the indexes are updated and any changes made since the crawler's last visit are recorded.

Each search engine employs customized software to maintain its database and enable web site retrieval. Some rely on keywords present on the indexed web site, such that any web site containing words or terms matching the user's search query will be presented in the results listing. Ranking each of these matching Web sites by relevance is determined by algorithms that analyse the location and frequency of the user's search terms against this list of matching Web sites. Therefore, inputting the same query on different search engines will yield different results because each search engine uses different algorithms and rules for building their databases.

How does Google Work?

Web page retrieval on Google is determined by the "PageRank" algorithm. The algorithm, unique to Google, uses the Web's link structure as an indicator of an individual page's value, and is based on the principle that a page linked to by many others is likely to be of interest to a random user. Google interprets a link from page A to page B as a vote, by page A, for page B. In addition to the number of 'votes' received, Google also analyzes the page that casts the vote; votes cast by pages that are themselves "important" weigh more heavily and help to make other pages "important". Google combines the PageRank system with text-matching techniques to retrieve pages that are both important and relevant to a search query. Google examines all aspects of the page's content (and the content of the pages linking to it) rather than simply the number of times a term appears on a page to ensure a good match to a particular search query (100).

Google Features

Google provides users with several search features and options. A user may search for web pages, images, discussion/Usenet newsgroups, and news articles and searches may be limited regionally such that search results are restricted to web sites hosted in a specified country. Google automatically edits queries for spelling errors and the most common version of a word's spelling, and suggests alternative spellings that are likely to retrieve more relevant search results (101). Other advanced searching features available on Google include phrase searches, "OR" searches, and date and language restrictions.

In addition to searching features, Google links to 'cached' and 'similar' pages on the results page. Cached links are 'snapshots' of web sites as they appeared when last indexed by Google. Google uses caches as a back-up when an original page is unavailable, thus enabling users to access 'dead' links or to view older versions of a recently changed site. Google also offers a 'similar pages' link, upon which a user may click to see a listing of similar web sites for a particular search result (101). Google also lists 'sponsored links' in addition to the main search results. Sponsored links are paid placement listings which guarantee a high ranking in relation to the web site operator's desired key words.

By searching only Google, only sites indexed by Google will be retrieved; it is possible that common sites indexed by other search engines will not be evaluated. No search engine indexes all pages on the World Wide Web. Google is an extremely popular search engine with many useful features and provides comprehensive coverage of the web, thus making it a reasonable choice for this study.

Privately-administered Gateways

Unlike search engines, gateways index only the sites that meet specific inclusion criteria. To identify potential sites and collect web site addresses, the privately administered gateway AllHealthNet.com was used.

AllHealthNet.com is a privately-administered gateway and Web directory created and managed by the All Health Development Corporation. AllHealthNet aims to provide consumers with the most comprehensive, highest quality source of medical and health information on the Internet and claims to be "the thread that holds the medical community together globally" (74). The information indexed by AllHealthNet.com is targeted to both individuals and health care professionals, does not require registration by the user, and is free to use.

It was proposed that web site evaluations would also include those retrieved by Aahoo.com and AllHealthNet.com. However, neither the Aahoo.com site nor its indexed sites are current; the homepage was last updated in 2000 and a test query resulted in only 9 active sites, and only three had been updated during the last year. Searching AllHealthNet.com yielded appropriate and current sites, necessary for inclusion.

How does AllHealthNet.com work?

AllHealthNet.com provides users with both directory and search engine features. Web directories differ from search engines in that they are designed for browsing a particular topic area rather than searching by specific keywords or phrases. AllHealthNet.com claims to provide only health and medical information and all sites are screened for accuracy by

medical research personnel prior to indexing (74). Specific criteria used for indexing are web sites unclear, and repeated attempts to contact the company were unanswered. However, the web site subscribes to the Health on the Net Foundation Code of Conduct (<http://www.hon.ch/HONcode/Conduct.html>) for health information, thus ensuring minimal accountability.

Publicly-administered Gateways

Publicly administered gateways are similar to privately administered gateways in that the index of web sites is created by an individual and that each web site must meet specific criteria for inclusion. However, publicly administered gateways do not accept advertising or outside resources, and funding support is received from federal government agencies.

To ensure an adequate sample size, it was proposed that four different publicly administered gateways be employed, including the Canadian Health Network (CHN) (<http://www.canadian-health-network.ca>), HealthInsite (<http://www.healthinsite.gov.au>), healthfinder (<http://www.healthfinder.gov>) and NHS Direct Online (<http://www.nhsdirect.nhs.uk/>). Upon initial searches, it appeared evident that searching the Canadian Health Network and healthfinder would provide a sufficient list of web sites. Although exact criteria for selecting web sites vary between the publicly-administered gateways, the basic criteria are similar, and both the CHN and healthfinder aim to provide consumers with valid and reliable health information. Human editors index information, and include only the sites meeting specific inclusion criteria for quality health information. Publicly administered gateways may target general health information seekers and health professionals. Users are not required to register and the service is free to all.

The Canadian Health Network

The Canadian Health Network (CHN) is a joint initiative between Health Canada and partner organizations designed to provide an electronic gateway to credible, practical health information related to health promotion and disease prevention. Established in 1999, the Network aims to provide Canadians with access to accurate, current, accessible, and easy to retrieve health information in both English and French. The site links to over 12,000 Canadian-based web resources meeting specific criteria on 26 different health topics and populations.

Network partners include Health Canada, national and provincial/territorial non-profit organizations, universities, hospitals, libraries and community organizations. Each organization must demonstrate expertise in a relevant content area, be a non-profit, Canadian organization, and be able to provide timely and credible information on health promotion and disease prevention. Content is reviewed by professional indexers for accuracy, currency, accessibility, and retrievability and ensure that search capabilities are operating as designed with intended results.

Healthfinder

Healthfinder is a web resource developed in 1997 by the US Department of Health and Human Services to guide consumers to reliable health information on the Internet. The site provides an easy-to-use, searchable index of carefully reviewed health information on over 100 topics from more than 1700 government agencies, nonprofits organizations, and

universities. Healthfinder indexes resources intended to provide basic information on various health topics.

Healthfinder works with several partner organizations to provide Internet health information. Partner sites must demonstrate an ability to provide accurate information, follow-up information, and be able to respond to information requests from consumers. The content of information is structured around organizations, specifically in their role as providers of consumer information. Each organization is reviewed to establish its general reliability, credibility, and ability to respond to public inquiries. Healthfinder employs a rigorous selection policy, and does not verify the accuracy of specific Web resources due to the dynamic nature of the Internet.

Appendix 2 – List of Possible Search Terms

Possible Search Terms

Search Term	Number of Hits
"Quit"	4 700 000
"Quit smoking"	464 000
"Stop smoking"	414 000
"Smoking cessation"	349 000
"Quitting smoking"	89 000
"Stopping smoking"	28 000
"Last cigarette"	23 900
"Smoking cessation program"	18 000
"How to quit smoking"	11 000
"Stop smoking program"	10 700
"How to stop smoking"	6 000
"Anti-smoking program"	1 580
"Cease smoking"	1 500
"End smoking"	1 000
"Smokers anonymous"	474
"Ending smoking"	174
"Ceasing smoking"	156

Appendix 3 - Web Selection Detailed Protocol

WEB SELECTION DETAILED PROTOCOL

A. Web Searching

1. Open Internet Explorer – Version 6.0 (*check for updates before beginning and document*)
2. Search Engine: Go to Google: www.google.ca
 - a. Set Google preferences:
 - i. Interface language – English
 - ii. Search language – any language
 - iii. Safe Search Filtering – use moderate filtering (this is the default, what most people likely have search engine set at)
 - iv. Number of results – display 100 (for the purposes of printing results) (default is 10)
 - v. Results window - Open search results in new browser
insert picture of page
 - vi. Type search terms into Google. This will be one search. Into the search query box, type “quit smoking” OR “smoking cessation” OR “quit” OR “stop smoking”. Search the Web and press Google search button.
insert picture of page
 - vii. Print first 500 hits. Record total number of hits. *It may be necessary to print more, but hopefully not!*
 - viii. Start inclusion assessment with the first web site listed.
3. Private Gateway: Go to AllHealthNet.com

NOTE: AllHealthNet.com does not allow for Boolean searching. Due to the restrictions, Michael Fox developed a searching strategy that would approximate as closely as possible the search strategy used for publicly administered gateways and Google. It is possible to conduct each search (using each search term) separately, yet simultaneously in four separate ‘windows’. Four separate lists of web sites will be generated, one list for each search term. The lists will then be combined into a single “meta-list” (similar to one generated by Google by “ranking” all of the web sites and placing them onto a single list in the order of their ranking. Web site rank will be based on All Health Net’s own ranking system, which assigns each web site a “score”. So, for example, the top web site generated from the phrase “quit smoking” had a score of 52%, while the top web site generated from the phrase “stop smoking” had a score of 69%. Therefore, the web site with the 69% score was placed ahead of the web site with the 52% score on our “meta-list”.

 - a. Conduct searches
 - b. Print results
 - c. Create meta-list by rank
 - d. Start inclusion assessment with the first web site listed

4. Public Gateway: Go to: Canadian Health Network (<http://www.canadian-health-network.ca/servlet/ContentServer?pagename=CHN-RCS/Page/SearchPageTemplate&cid=1042668268893&c=Page&lang=En>)
 - a. Open search page (<http://www.canadian-health-network.ca/servlet/ContentServer?pagename=CHN-RCS/Page/SearchPageTemplate&cid=1042668268893&c=Page&lang=En> - specify that you will be conducting a Boolean search in the search options box
 - b. Enter search phrases in the Keyword Search Section
 - c. Record number of hits and print results

5. Public Gateway: Go to HealthInsite: (<http://www.healthinsite.gov.au>)
 - a. Open web site
 - b. Enter search phrases into the search box
 - c. Hit the "quick search" button
 - d. Record number of hits and print results
There is no need to specify Boolean searching.

6. Public Gateway: Go to healthfinder (www.healthfinder.gov)
 - a. Open web site
 - b. Enter search phrases
 - c. Record number of hits and print results
There is no need to specify Boolean searching.

7. Public Gateway: go to NHS Direct Online (<http://www.nhsdirect.nhs.uk/>)
 - a. Open web site
 - b. Enter search phrases
 - c. Record number of hits and print results
There is no need to specify Boolean searching.

NOTE: results of the publicly administered gateways will be combined in rank order. Web sites will retain the rank assigned by the gateway, ie. There will be ties.

B. Selecting Web Sites

From the homepage, use the intake form (Microsoft Access) to determine what web sites meet the inclusion criteria. All information necessary to complete the web intake form should be accessible within three links/clicks away from the home page. (This is based on recommendations for a usable web site.)

Definitions:

1. Web site address/URL: Uniform Resource Locator
2. Web site ID: number assigned from MF to classify web site
– *identification will include information for classifying sites according to search tool*
3. Web site rank: rank assigned during the selection process
4. Search Tool: method used to access web site

- ◆ Google
 - ◆ AllHealthNet.com
 - ◆ Canadian Health Network
 - ◆ Healthfinder
 - ◆ HealthInsite
 - ◆ NHS Direct Online
5. Web site Category: Web site ownership
- ◆ Nongovernmental Organization: non- profit organization, not part of a local, provincial, or federal government. This may include community agencies, universities (institutions of higher education) and hospitals.
 - ◆ Government: federal, provincial/state or local government agency
 - ◆ Private Industry: commercially interests, site is usually associated with selling or advertising a product. May include private hospitals or HMOs (Health Maintenance Organizations)
 - ◆ Private Individual: individual of the general public
 - ◆ Unable to determine: site does not fall in one of the above categories, provide a description
6. Country of Origin: place , where the web site is hosted, offered from (check about us)
7. Inclusion Criteria:
- ◆ Is there a statement of the main purpose of the web site? This information should be readily apparent on the homepage or found easily using a site map/search tool.
 - ◆ If no, can the mail purpose be implied? This information should also be readily apparent on the homepage or found easily using a site map/search tool.
 - ◆ Summarize the main purpose – provide a brief description of the web site
8. Type of Web site
- ◆ Brief information on the health effects of smoking
 - ◆ Information on quit smoking strategies
 - ◆ Structured approach to quitting
 - ◆ May answer more than one
9. Language: English (yes or no), record other language
10. Exclusion Criteria
- ◆ Web site only promoting or selling cessation aids – sole purpose of the site is to sell something, i.e. online pharmacy
 - ◆ Web site access ONLY available through paid registration – must pay to access anything. Free registration is okay
 - ◆ Link goes to a dead web site – we are not using cached sites – if the connection fails, the site is not to be included.

Appendix 4 – Web Site Intake Form

Web site ID: _____

Web site rank: _____

Web site address/URL: _____

Title of web page: _____

Search Tool:

- Google
- AllHealthNet.com
- Canadian Health Network
- Healthfinder
- HealthInsite
- NHS Direct Online

Web site Category:

- Nongovernmental Organization
- Government
- Private Industry
- Private Individual
- Unsure

Describe: _____

Country of Origin: _____

Inclusion Criteria

Is there a statement of the main purpose/goal/objective of the web site?

Yes No

If no, can the main purpose/goal/objective of the site be implied by the title?

Yes No

Summarize the main purpose: _____

Type of Web site:

- Brief information on the health effects of smoking
- Information on quit smoking strategies (e.g. "tips and tricks" to quit smoking, etc.)
- Structured approach to quitting (e.g. self-help manual, guided intervention, etc.)

Language of web site:

English Other

Target Audience: _____

Free Registration:

Exclusion Criteria:

Any of the following:

- Web site *only* promoting or selling cessation aids, i.e. snuff
- Web site access *only* available through paid registration
- Link goes to dead web site

Include web site in evaluation

Do not include web site

Appendix 5 - Web Site Evaluation Reference Manual

Section One:

The first section focuses on the standard evaluation criteria. The following is a description of the questions and guidelines for answering.

1. Is the author clearly identified?

Author: the web site provider, person or organization who owns or operates the web site. This does not include the web host or site developer.

Where to Look: Author identification should be made clearly on the home, “about us” page, or “advisory/editorial board” page.

To score:

Is the name of the author on the clearly identified?

If yes, score = 1. Yes

If No: score = 0. No

2. Are the site author's credentials or qualifications clearly identified?

Credentials: qualifications of the author should be clearly stated (i.e. patient, Internet professional, medical or health professional) Where appropriate, the qualification (i.e. MD, BSc) should be made clearly visible.

Where to Look: Credential information should be made clearly on the home or “about us” or advisory board pages.

To score:

Are the author's qualifications made clear (i.e. patient, Internet professional, medical or health professional, including degrees obtained)?

If yes, score = 1. Yes

If no, score = 0. No

Note: We can't assume credentials. In the case of institutions, credentials of individuals should be included.

3. Do the author's credentials and/or experiences relate to the knowledge of the field that is required for the site's subject discussions?

Related Experiences: health care professional, personal site explaining an individual's quitting experiences

To score:

- If credentials are listed are related, then score = 1. Yes
- If irrelevant credentials, then score = 0. No
- If no credentials listed, then score = 0. No

Note: group sites should mention a collaborative effort.

4. Does the author provide contact information?

Contact Information: A means of reaching the web site author, such as an email address or link, telephone number, or physical address

Where to Look: "Contact us" page

To score:

- If all three means of contact (email, phone, address) are provided, then score = 1. Yes
- If there is no means of contact, then score = 0. No
- If one of email, phone or mailing address is provided, then score = 0.5

5. Can you determine who has paid for or sponsored the web site?

Web site should include a statement of funding.

Funding: any financial material or in kind support provided by organizations or individuals towards the development or maintenance of a web site.

Where to Look: "About us" page or on a financial disclosure page. This information should be clearly labelled (i.e. it only takes one or two clicks to find it).

To score:

- If financial information is disclosed, then score = 1. Yes
- If no financial information is disclosed, then score = 0. No

6. When financial conflict or bias appears to exist, is there a statement of explanation?

A statement of explanation would include reasons for accepting money or support from outside sources. Additionally, web sites should clearly identify advertising as a source of funding.

Where to Look: A statement of explanation is likely to be on a disclaimer page.

To score:

If a statement explaining financial conflict exists, then score 1. Yes

If such a statement is not present, then score = 0. No

If there is no financial conflict or bias, then score = 99. Not applicable

7. Does the site provide a disclaimer statement indicating the limitations of the information posted on the site?

Disclaimer: describes the limitations, purpose, scope, authority, and currency of the information. It should emphasize that content is general health information and not medical advice.

Example, "The information provided is designed to support, not replace, the relationship that exists between a site visitor and health care professional."

Where to Look: Look for a disclaimer statement or page

To score:

If a statement disclaimer exists, then score 1. Yes

If such a disclaimer is not present, then score = 0. No

8. Is there a privacy statement that addresses confidentiality and security of personal information?

Site must describe how confidential, private, or semi-private information, such as email addresses, email content, and exchanges will be used or treated. Note: This applies regardless of whether the site hosts patient records or stores any medical or personal information.

Where to Look: Look for a privacy statement or page.

To score:

If a statement exists, then score = 1. Yes

If no statement exists, then score = 0. No

9. Are the purposes/objectives of the site clearly stated?

Where to Look: on the homepage or first link/click from the homepage

To score:

If the statement of purpose is clear, then score = 1. Yes

If the purpose is unclear, then score = 0. No

10. Is a site map provided?

Site map: Table of contents or 'map' of the pages available on the web site.

Where to Look: homepage or tabs at the top or bottom of each page.

To score:

If the site map is present, then score = 1. Yes

If no site map is present, then score = 0. No

10. Is a search engine provided?

Search engine: query box is present on the page. The search engine aid specific word searching.

Where to Look: homepage, or search tab at the top or bottom of each page.

To score:

If the search engine is present and functional, then score = 1. Yes

If no search engine is present, then score = 0. No

11. Do the search tools provided assist you in using the site?

Search tools: Tools such as a site map or search engine that aid the user in navigating the web site

To score:

If yes, then score = 1. Yes

If no, then score = 0. No

Also, rate search tool use on a Likert scale, where 0 is not at all helpful and 1 is extremely helpful.

12. Is the site easily navigable and presented in an organized manner?

This is a subjective assessment of the ease of following the site.

To score:

If yes, then score = 1. Yes

If no, then score = 0. No

Also, rate search tool use on a Likert scale, where 0 is not at all helpful and 1 is extremely helpful.

13. When information exchange between users is available, is there a moderator present?

Information exchange may occur in the form of a bulletin board or chat room.

Moderator: skilled professional trained in smoking cessation counselling, credentials of this person are clearly identified.

Bulletin Board (forum, message board): A place for people to virtually meet online where they can post messages and respond to each other.

Chat Room: A place online where a group of people can get together and chat about a particular subject or just to chat. Usually you will need to sign in at least so you have a name in the room and then you can see who else is in the room. Some chat rooms allow you to talk to one individual without the others seeing your conversation. Conversations are live.

* The difference between a bulletin board and chat room is that a chat room is LIVE. A monitor should be present on both.

To score:

If information exchange is available and a moderator is present, then score = 1. Yes

If information exchange is available and a moderator is not present, then score = 0. No

No

If there is no information exchange, then score = 99. Not applicable

14. Can factual information be verified through footnotes or bibliographies to other sources?

Factual information will be contained in different sections of the web site – We are interested in the information associated with smoking cessation information – risks of smoking, benefits of quitting, statistics on quitting, etc.

To score:

If a main statement of 'fact' (prominent piece of information) is accompanied by a reference to the source of evidence **AND** a source of evidence is linked to or listed in a bibliography or reference list at the end of the publication, then score = 1. Yes

If no references are provided, then score = 0. No

NOTE: simply the name of the original author or mentioning the journal name is not appropriate. There should be enough bibliographic information that a user may find the source, i.e name of author, date of publication and publication source.

If most factual information is cited, then yes. If only some of factual information is cited, then no.

15. If publications or sources are referenced, is the information:

Popular press: newspapers or magazines or other web sites

Peer-reviewed literature: journals, if unsure go to journal homepage or UBC library (www.library.ubc.ca) for information about that journal

To score:

If in popular press only, then score = 0.5

If in peer-reviewed literature only, then score = 0.5

If in both, popular press and peer-reviewed literature, then score = 1

If references are in neither popular press or peer-reviewed literature or no sources are listed, then score = -1

16. If the author is not referring to a source when making a claim, does he/she state that it is his/her opinion?

Information not accompanied by references should be examined for consideration of a claim. If such information exists, is there a qualifying statement that it is the opinion of the author and not based on fact?

Think about absurd claims. i.e. "proven results – quit smoking in 24 hours!"

Also consider that the need for providing a reference depends on:

- who is writing the 'claim'. If a high school student wrote a paper and says that smoking causes lung cancer, a reference is necessary. However, if a lung specialist wrote that smoking causes lung cancer, a reference would not necessarily be expected.
- where the information is coming from. Generally a fact cited in a text book or encyclopaedia may be considered common knowledge. The piece of information has likely been cited at conferences, in papers, etc. and lots of people know about it.

Appropriate reference also depends on reliability/credibility of the source, i.e. if the CCS says that smoking causes lung cancer you can probably trust it.

To score:

If a claim is made and is accompanied by a disclaimer statement that it is the author's opinion, then score = 1. yes

If a claim is made and is not accompanied by a disclaimer, then score = 0. No

If no claims are made, then score = 99. Not applicable, no opinions.

17. Is there a means to determine how current the information is?

An indication of when the web site was last updated, i.e. copyright, "last updated".

Does not apply to date automatically generated by the server. Automatically generated dates would be a date stamp on the top of the page – "today is..."

Where to Look: Bottom of homepage and other information pages.

A copyright or 'last updated' date should be easily noticed.

To score:

If you are able to determine when the last date of update was, then score = 1. Yes
If you are unable to determine the date of last update, then score = 0. No

18. Is the information still current?

Current information: evidence of a site update during the last year.

Where to Look: First look on individual pages for date of last update? If there is no last date of update, check for copyright, i.e. 2002,2003

To score:

If date of last update is within the last year (dated 2003), then score = 1. Yes
If date of last update is not within the last year, then score = 0. No
If you are unable to determine last date of update, then assume information is not current and score = 0. No

NOTE: some pages within a site will have different update dates, if at least one page has a recent update, answer YES. This indicates that the site owner is doing some updating, and not all pages need updating.

19. Is the information still relevant?

Relevant information: accepted practices of smoking cessation. Recommendations of herbal therapy, laser treatment, or acupuncture may be considered irrelevant – there is no scientific evidence for their effectiveness. For further clarification, refer to summary of Cochrane Tobacco Group Reviews (attached).

Pay attention to 'wacky' information or strange claims.

To score:

If information is relevant, then score = 1. Yes
If information is irrelevant, then score = 0. No

20. Is the information balanced and unbiased?

One bias will cancel any unbiased information presented. Balanced and unbiased information will provide users with different cessation options, and will not appear to be only promoting a particular product.

To score:

If it appears that a sincere effort was made to present fair and unbiased information, and the information presented is balanced, then score = 1. Yes
If the information is biased, then score = 0. No

21. Does the site give good health behaviour change information?

This is a subjective decision of the quality of information based on your knowledge of behaviour change and behaviour change theory.

To score:

If yes, then score = 1. Yes

If no, then score = 0. No

Also, rate search tool use on a Likert scale, where 0 is not at all helpful and 1 is extremely helpful.

Summary of Cochrane Reviews

The following is a summary of the most recent reviews available in the Cochrane Database of Systematic Reviews. They will be useful in assessing relevant information contained in web sites and usefulness of information presented.

1. Acupuncture for smoking cessation

Acupuncture and related techniques are promoted as a treatment in the belief that they may reduce nicotine symptoms. There is no clear evidence that acupuncture, acupressure, laser therapy or electro stimulation are effective for smoking cessation. The results of single studies suggest that acupressure was superior to advice.

2. Antidepressants for smoking cessation

There are two reasons to believe antidepressants might help in smoking cessation: 1) depression may be a nicotine withdrawal symptom, and 2) smoking cessation precipitates depression. In some individuals, nicotine may have antidepressant effects that maintain smoking. Antidepressants may substitute for this effect.

Conclusions suggest that the antidepressants bupropion and nortriptyline can aid smoking cessation but selective serotonin reuptake inhibitors (e.g. fluoxetine) do not.

3. Anxiolytics for smoking cessation

There are two reasons to believe that anxiolytics may help in smoking cessation: 1) anxiety may be a symptom of nicotine withdrawal, 2) smoking appears to be due, in part, to deficits in dopamine, serotonin and norepinephrine, all of which are increased by anxiolytics and antidepressants.

There is no consistent evidence that anxiolytics aid smoking cessation, but the available evidence does not rule out a possible effect.

4. Aversive smoking for smoking cessation

Aversion therapy pairs the pleasurable stimulus of smoking a cigarette with some unpleasant stimulus. The objective is to extinguish the urge to smoke.

The existing studies provide insufficient evidence to determine the efficacy of rapid smoking, or whether there is a dose-response to aversive stimulation. Rapid smoking is an unproven method with sufficient indications of promise to warrant evaluation using modern rigorous methodology.

5. Clonidine for smoking cessation

Clonidine was originally used to lower blood pressure. It acts on the CNS and may reduce withdrawal symptoms in various addictive behaviours, including tobacco use. Based on a small number of trials, (potential bias), clonidine is effective in promoting smoking cessation. Prominent side effects limit its usefulness.

6. Exercise interventions for smoking cessation

The Group compared trials using an exercise program as an adjunct to a cessation program. One of eight trials offered evidence for exercise aiding smoking cessation, the other trials were too small to exclude reliably an effect of intervention. It is unclear how exercise interventions affect smoking cessation outcomes.

7. Hypnotherapy for smoking cessation

Hypnotherapy is proposed to act on underlying impulses to weaken the desire to smoke or strengthen the will to stop. The review was unable to show that hypnotherapy has a greater effect on six month quit rates than other interventions or no treatment.

8. Lobeline for smoking cessation

Lobeline is a partial nicotine agonist, has been used in a variety of commercially available preparations to help stop smoking. There is no evidence available that lobeline can aid smoking cessation.

9. Mecamylamine for smoking cessation

Mecamylamine is a nicotine antagonist (blocks the effects of nicotine). It may block the rewarding effect of nicotine and thus reduce the urge to smoke. Small studies suggest that the combination of nicotine and mecamylamine may be superior to nicotine alone in promoting smoking cessation. These results require confirmation in larger studies before the treatment may be recommended clinically.

10. Nicotine replacement therapy for smoking cessation

The aim of NRT is to replace nicotine from cigarettes. This reduces withdrawal symptoms. All of the commercially available forms of NRT (gum, patch, nasal spray, inhaler and lozenges) are effect as part of a strategy to promote smoking cessation. They increase quit rates ~ 1.5-2 fold regardless of setting. The effectiveness of NRT appears to be largely independent of the intensity of additional support provided to the smoker. Provision of more intense levels of support, although beneficial in facilitating the likelihood of quitting, is not essential to the success of NRT. (Pierce argument not included here. Studies report at least six month follow-up)

11. Opioid antagonists for smoking cessation

The reinforcing properties of nicotine may be mediated through release of various neurotransmitters. Smokers report positive effects and relief of negative affect. Opioid antagonists are of particular interest as potential agents to attenuate the rewarding effects of cigarette smoking. Based on limited data – it is not possible to confirm/refute whether naltrexone helps smokers quit.

12. Silver acetate for smoking cessation

Silver acetate produces an unpleasant taste when combined with cigarettes, thereby producing an aversive stimulus. It has been marketed in various forms with the aim of extinguishing the urge to smoke, by pairing the urge with an unpleasant stimulus. There is little evidence for a specific effect of silver acetate in promoting smoking cessation. Lack of effect may reflect poor compliance. (Treatment = unpleasant stimulus)

13. Herbal remedies for smoking cessation

Herbal remedies are for sale, but there is no scientific evidence to support the claim that they are effective. No Cochrane review. No studies on Pub Med.

Section Two:

Guidelines for essential elements of self-help/minimal intervention smoking cessation programs, published by the National Cancer Institute (NCI), form the basis of the checklist to determine evidence-based criteria scores. The NCI guidelines provide recommendations for general content and structure, but do not define specific strategies or information necessary for inclusion. Specific strategies were derived from the Clinical Practice Guidelines for Treating Tobacco Use and Dependence (the Guidelines) to assess the general NCI guidelines.

In an attempt to increase the patient's motivation to quit tobacco, the Guidelines recommend identifying the potential negative consequences of tobacco use. Examples of risks are acute/short term risks, long term risks, and environmental risks.

1. Does the site inform the user of acute risks of smoking cigarettes?

There are several short-term risks associated with tobacco use. Acute risks are the immediate effects of tobacco use. Some examples of acute risks are:

- Shortness of breath
 - Exacerbation of asthma
 - Harm to pregnancy
 - Impotence
 - Infertility
 - Increase of serum CO
- Social issues around the declining acceptance of social tobacco use

To score:

1. Yes – the site mentions some of the acute risks associated with smoking cigarettes. Risks mentioned are accurate.
0. No – the site does not mention any of the acute risks associated with smoking cigarettes.

2. Does the site inform the user of long-term risks of smoking cigarettes?

Smoking impacts all body functions. While there seem to be some health protective effects (e.g. protection from Parkinson's disease), there are many more health risks associated with smoking. Some examples of long term risks include:

- Increased risk of:
 - Cancer (including lung, oesophagus, bladder, kidney, stomach, pancreas)
 - Chronic obstructive pulmonary disease
 - Coronary heart disease
 - Stroke
 - Peripheral vascular disease
 - Peptic ulcer disease
- Smoking during pregnancy increases the risk of:
 - Spontaneous abortion
 - Stillbirth
 - Prematurity
 - Low birth weight
 - Sudden infant death syndrome (SIDS)
- Long-term disability and need for extended care

To score:

1. Yes – a site indicates that there are long-term risks associated with smoking cigarettes; specific mention should be made of increased risk of cancer, COPD, and cardiovascular disease. Risks mentioned are accurate.
0. No – the site does not mention any of the long-term risks associated with smoking cigarettes.

Other Facts:

Research suggests that half of all long-term regular smokers who begin smoking during adolescence can expect to die from tobacco use, and 50% of these die prematurely during middle age, losing some 20-25 years of life expectancy compared with non-smokers (Peto)

Effects on the respiratory system:

Smoking irritates and damages the respiratory tract. Tobacco users have a higher risk of developing major lung diseases (e.g. COPD, emphysema, chronic bronchitis), pneumonia and influenza. Smoking during adolescence retards lung development and reduces the level of maximum lung function. Smoking is the major cause of histological types of lung cancer.

Effects on the cardiovascular system:

Fatal myocardial infarction (heart attack) is four times more common in young male smokers than in non-smokers of the same age. The progression of atherosclerosis in the carotid arteries is directly related to total pack years of tobacco exposure. The relative risk of stroke increases about 3 times with smoking and is dependent on the number of cigarettes smoked. Smoking is also a risk factor for transient ischemic attacks (similar to stroke) and peripheral vascular disease.

Effects on the Gastrointestinal System:

Smoking is a risk factor for oral, oesophageal, pancreatic and colorectal cancers. The risk of developing gastric and duodenal ulcers or Crohn's disease increases with smoking.

Effects on Other Body Systems:

Smokers are at greater risk of developing cataracts, macular degeneration. Additionally, studies have linked smoking with premature wrinkling, atopic dermatitis, and psoriasis. Smoking is also associated with loss of bone mineral density and osteoporosis in the elderly, and has been implicated as a contributory factor in one of eight hip fractures.

3. Does the site inform the user of environmental risks associated with smoking cigarettes?

Exposure to environmental tobacco smoke (ETS) increases the risk of disease and disability in non-smokers.

Passive exposure to ETS

- Increases the risk of lung cancer, heart disease, and respiratory illness
- Increases the risk of SIDS and causes asthma and respiratory infections
- Can adversely effect toddler behaviour and interfere with cognitive and academic performance
- Increases the likelihood of a child becoming a smoker later in life

To score:

1. Yes – the site indicates that there are environmental risks associated with smoking cigarettes. The risks mentioned are accurate.

0. No – the site does not mention any of the environmental risks associated with smoking cigarettes.

4. Does the site inform the user about the potential benefits of stopping tobacco use?

The Guidelines recommends that clinicians ask patients to identify potential benefits of stopping tobacco use. Some benefits will occur immediately while others occur over a longer period of time. Some benefits include:

- Improved sense of smell
- Food will taste better
- Saving money
- Improved self esteem
- Environment (home, car, clothing, breath) will smell better
- Healthier babies and children
- No worry about exposing others to smoke
- Perform better in physical activities
- Reduced wrinkling/aging of skin
- Health Benefits

To score:

1. Yes – the site indicates that there several benefits to stopping smoking cigarettes. The benefits mentioned are accurate.

0. No – the site does not mention any of the benefits of stopping smoking cigarettes.

Other Benefits:

Many smoking-related adverse health effects are reversible upon smoking cessation. The greatest benefit of smoking cessation is obtained from stopping smoking when young, yet even quitting in middle age avoids much excess risk.

Respiratory System:

Pulmonary function improves by approximately 5% within several months of quitting smoking, the rate of decline in pulmonary function continues to slow and the risk of COPD diminishes. Smoking cessation reduces the risk of lung cancer, the severity and progression of premalignant histological changes, and the risk of further neoplasms. I

Cardiovascular System:

The excess risk of coronary heart disease halves within one year of stopping smoking, and after 15 years is equivalent to that in non-smokers. Excess risk of stroke is similar to that of non-smokers within 5-15 years.

Gastrointestinal System:

Patients with Crohn's disease who stop smoking for at least one year have a more benign disease course, similar to that of non-smokers. Fewer duodenal ulcer relapses were reported in former smokers. Clear reductions in colorectal cancer mortality.

Reproduction and Growth:

Smoking cessation in pregnancy is considered the most effective method of reducing negative pregnancy outcomes.

5. Does the site help the user establish a quit plan?

The Guidelines suggest that one component of aiding a patient in quit attempt is to help the patient establish a quit plan. A quit plan is a collection of strategies that the smoker may use to quit. The Guideline suggests that a quit plan be composed of the following:

- Setting a quit date, ideally within two weeks
- Tell family and friends about quitting and request understanding and support
- Anticipate challenges to planned quit attempt, including nicotine w/d symptoms
- Remove tobacco products from your environment

To score:

- a. Does the site help the user establish a quit date?
 1. Yes
 0. No
- b. Does the site suggest that the user should recruit family and friend support?
 1. Yes
 0. No
- c. Does the site suggest that the user remove tobacco products from his/her environment?
 1. Yes
 0. No
- d. Does the site help the user anticipate challenges to a planned quit attempt?
 1. Yes
 0. No

6. Does the site provide problem solving/skills training?

A second component in aiding a patient quit smoking is the provision of practical counselling (problem solving/skills training) Problem solving and skills training will address important

issues facing the smoker in a quit attempt. It will address skills necessary to deal with abstinence, learning from past quit attempts, and how to anticipate triggers and challenges.

The common elements of problem solving and skills training described in the Guidelines include:

1. Recognizing Tempting/Danger Situations: This involves training the user to identify events, internal states, or activities that he/she believes may increase his/her risk of smoking or relapsing. The most common situations that lead to lapses include being around those who smoke, being in places where cigarettes are available or where smoking is allowed, and drinking alcohol and experiencing negative moods.

The focus of training in problem solving and using appropriate skills is to increase awareness of cues to smoke, as well as to empower the patient in dealing with urges, by teaching coping strategies. Common strategies include looking for patterns of urges; when is the smoker tempted most? Who is she/he with? What is she doing? How long do the urges last? A user may be encouraged to record the most tempting scenarios and to think of strategies that would help her to fight the urges.

2. Coping Strategies are techniques use to fight the urge to smoke. The emphasis should be to encourage users to experiment, practice, and adopt as many different coping skills as possible. Some examples are:

“**Avoid** situations that you may not be ready to handle yet, such as going to a smoke-filled bar.”

“**Cope**, using strategies that help you deal successfully with tempting situations.”

Example may include distraction (i.e. exercise, go for a walk) or engaging in incompatible behaviours (i.e. chewing gum, playing with something in your hand, toothpicks) Positive self-talk can be used when and wherever.

“**Escape** from circumstances that you cannot avoid and find that you are not ready to handle.”

3. Stress Management: The most common precipitant of smoking relapse has found to be negative affect. Smokers often associate smoking with relaxation and stress reduction, but this is not the case. Smoking is not a method for handling stress. Stress-management strategies can be broadly divided into two categories: those that focus on relieving the stress response (tension, anxiety) and those that focus on problem solving to control the present and future situation. Some techniques for relieving stress responses are deep breathing, visual imagery, progressive muscle relaxation, positive self-talk, and engaging in distractive behaviours.

To score:

1. Yes – the web site provides components of the problem solving/skills training described above. The information is accurate.

0. No – The web site does not describe problem solving techniques.

7. Does the site include information on withdrawal?

Withdrawal is the process of ceasing to take an addictive drug. The severity and duration of withdrawal symptoms vary among individuals, but the symptoms are generally very unpleasant and frequently intolerable. Onset begins within a few hours of the last cigarette and includes an increased tendency to smoke, impaired cognitive function, and altered electrosurgical function. Most of these symptoms peak within 48 hours after the last cigarette and then gradually decline in intensity, but some symptoms such as craving for nicotine, increased appetite and impaired concentration may continue for several months or years.

Other symptoms of nicotine withdrawal include craving, depression, anxiety, and difficulty in concentrating, dysphoria, increased appetite, insomnia, irritability, frustration, anger, restlessness and decreased heart rate.

To score:

1. Yes – The web site accurately defines withdrawal and explains potential symptoms.
0. No – There is no mention of withdrawal symptoms.

8. Does the site provide appropriate information for recommending pharmacotherapy?

Several different pharmacotherapies have been shown to be effective at increasing quit rates. Two of the most common include nicotine replacement therapy (NRT) and bupropion.

Nicotine Replacement Therapy:

Nicotine replacement therapy may be used to replace the nicotine from cigarettes, thus decreasing withdrawal symptoms and helping smokers to resist the urge to smoke cigarettes. All of the commercially available forms of NRT (nicotine gum, transdermal patch, nicotine nasal spray, nicotine inhaler, and nicotine sublingual table) have been shown to increase long term quit rates approximately 1.5 to 2 fold regardless of the setting. The Guidelines recommend that all smokers trying to quit may use NRT, EXCEPT special considerations should be given to those with medical contraindications, those smoking fewer than 10-15 cigarettes per day, pregnant/breast feeding women, and adolescent smokers.

Appropriate recommendations are especially important since, in many locations, NRT is available without a prescription.

Bupropion (Zyban):

Bupropion is an antidepressant, the commercial name is Zyban. It is believed that antidepressants aid in smoking cessation for two reasons: 1) depression may be a nicotine withdrawal symptom, and 2) smoking cessation precipitates depression. In some individuals, nicotine may have antidepressant effects that maintain smoking. Antidepressants may substitute for this effect.

A Cochrane review on antidepressants for smoking cessation found sufficient evidence to endorse the use of bupropion in clinical practice. The Guidelines caution against the use of

bupropion in pregnant smokers. Bupropion is contraindicated in individuals with a history of seizure disorder, a history of an eating disorder, who are using another form of bupropion (Wellbutrin or Wellbutrin SR), or who have used an MAO inhibitor in the past 14 days. Common side effects include insomnia, dry mouth, and nausea.

Several other pharmaceutical agents have been reviewed by the Cochrane Tobacco Group (2003), and may be mentioned.

Other Pharmaceuticals with Positive Outcomes:

Other antidepressants for smoking cessation: The antidepressant nortriptyline can aid smoking cessation, but selective serotonin reuptake inhibitors (e.g. fluoxetine) do not.

Other Pharmaceuticals with Limited Evidence:

Anxiolytics: There are two reasons to believe that anxiolytics may help in smoking cessation: 1) anxiety may be a symptom of nicotine withdrawal; 2) smoking appears to be due, in part, to deficits in dopamine, serotonin and norepinephrine, all of which are increased by anxiolytics and antidepressants. There is no consistent evidence that anxiolytics aid smoking cessation, but the available evidence does not rule out a possible effect.

Clonidine: Clonidine was originally used to lower blood pressure. It acts on the central nervous system and may reduce withdrawal symptoms in various addictive behaviours, including tobacco use. Based on a small number of trials, clonidine has the potential to be effective in promoting smoking cessation. Prominent side effects limit its usefulness.

Mecamylamine for smoking cessation: Mecamylamine is a nicotine antagonist (blocks the effects of nicotine). It may block the rewarding effect of nicotine and thus reduce the urge to smoke. Small studies suggest that the combination of nicotine and mecamylamine may be superior to nicotine alone in promoting smoking cessation. These results require confirmation in larger studies before the treatment may be recommended clinically.

Opioid antagonists: The reinforcing properties of nicotine may be mediated through release of various neurotransmitters. Smokers report positive effects and relief of negative affect. Opioid antagonists are of particular interest as potential agents to attenuate the rewarding effects of cigarette smoking. Based on limited data – it is not possible to confirm or refute whether naltrexone helps smokers quit.

Other Pharmaceuticals with no evidence:

Lobeline: Lobeline is a partial nicotine agonist, has been used in a variety of commercially available preparations to help stop smoking. There is no evidence available that lobeline can aid smoking cessation.

Silver acetate: Silver acetate produces an unpleasant taste when combined with cigarettes, thereby producing an aversive stimulus. It has been marketed in various forms with the aim of extinguishing the urge to smoke, by pairing the urge with an unpleasant stimulus.

There is little evidence for a specific effect of silver acetate in promoting smoking cessation. Lack of effect may reflect poor compliance. (Treatment = unpleasant stimulus)

Herbal remedies: Herbal remedies are for sale, but there is no scientific evidence to support the claim that they are effective.

To score:

1. Yes – the web site provides accurate information regarding pharmaceutical treatments.

0. No – the web site provides misleading or inaccurate information regarding pharmaceutical treatments. One piece of inaccurate information = 0.

9. Is online support provided?

As part of an attempt to assist quitting, the Guidelines recommend the provision of extra-treatment social support. On a web site, this may be the provision of supervised online support. Online support may include email inquiries, chatrooms, or bulletin boards. Online support should directly address behaviour/addiction problems rather than technical problems.

To score:

1. Yes – the site provides online support services supervised by a professional trained in smoking cessation counselling.

0. No – the site makes no provision of supervised online support services

10. Does the site provide external links/resources?

The Guidelines suggest that clinicians provide supplementary materials to the patient. The Guideline suggests resources from federal agencies, non-profit agencies or local health departments addressing culturally/racially/educationally/age appropriate information. We will not be assessing link quality.

To score:

1. Yes – external links are provided

0. No – no external links are present

11. Are strategies for successful maintenance and avoiding relapse presented?

The Guideline recommends that clinicians encourage patients in active discussion of the problems encountered or anticipated threats to maintaining abstinence (e.g. Depression, weight gain, alcohol, other tobacco users in the household) and describes potential responses. Some examples described are:

- Negative mood/depression – prescription or referral to counselling.
- Strong withdrawal symptoms – prescription of the appropriate pharmacological interventions
- Weight gain – explain that weight gain of 5-10 pounds is common and appears to be self-limiting, ‘prescription’ of healthy diet and increased exercise.

- Flagging motivation/feeling deprived – explain that feelings are common, recommend rewarding activities, emphasize that beginning to smoke will increase urges and make quitting more difficult

A web site has limited ability to provide support and encourage; however appropriate information regarding relapse may be provided. Web sites should include information for seeking appropriate support, managing withdrawal, and weight gain.

To score:

1. Yes – appropriate and accurate information is provided regarding successful maintenance and relapse prevention.

0. No – the web site does not provide accurate or appropriate information.

12. Is the site easy to read?

Scored by CCM.

Appendix 6 – Web Site Evaluation Form

General Information:

Date: _____

Web site ID: _____

Time Started: _____

Rater: _____

Web site address/URL: _____

Title of web page: _____

Section One: Standard Criteria

1. Is the author clearly identified?	1. 0.	Yes No
2. Are the site author's credentials/qualifications clearly identified?	1. 0.	Yes No
3. Do the author's credentials and/or experiences relate to the knowledge of the field that is required for the site's subject discussions?	1. 0.	Yes No *if no credentials, then no
4. Can you determine who has paid for or sponsored the web site?	1. 0.	Yes No
5. When financial conflict or bias appears to exist, is there a statement of explanation?	1. 0. 99.	Yes No Not applicable, no bias
6. Does the site provide a disclaimer statement indicating the limitations of the information posted on the site?	1. 0.	Yes No
7. Does the author provide contact information?	1. 0. 0.5	Yes No One of, phone, email, or mail
8. Is there a privacy statement that addresses confidentiality and security of personal information?	1. 0.	Yes No
9. Are the purposes/objectives of the site clearly stated?	1. 0.	Yes No
10. Is a site map provided?	1. 0.	Yes No
11. Is a search engine provided?	1. 0.	Yes No
12. Do the search tools provided assist you in using the site?	1. 0. Rate	Yes No 0.0 0.2 0.4 0.6 0.8 1.0
13. Is the site easily navigable and presented in an organized manner?	1. 0. Rate	Yes No 0.0 0.2 0.4 0.6 0.8 1.0
14. When information exchange between users is available, is there a moderator present?	1. 0. 99.	Yes No N/A – no exchange
15. Can factual information be verified through footnotes or bibliographies to other sources?	1. 0.	Yes No
16. If publications or sources are referenced, is the information:	0.5 0.5 1.0 -1.0 -0.5	In popular press only In peer-reviewed literature only Both Neither Does not apply (no sources)

17. If the author is not referring to a source when making a claim, does he/she clearly state that it is his/her opinion?	1. 0. 99	Yes No Not applicable, no opinions
18. Is there a means to determine how current the information is?	1. 0.	Yes No
19. Is the information still current?	1. 0.	Yes No
20. Is the information still relevant?	1. 0.	Yes No
21. Is the information balanced and unbiased?	1. 0.	Yes No
22. Does the site give good health behaviour change information?	1. 0. Rate	Yes No 0.0 0.2 0.4 0.6 0.8 1.0

Section Two: Evidence-based Criteria

1. Does the site inform the user of acute risks of smoking cigarettes?	1. 0.	Yes No
2. Does the site inform the user of long-term risks of smoking cigarettes?	1. 0.	Yes No
3. Does the site inform the user of environmental risks associated with smoking cigarettes?	1. 0.	Yes No
4. Does the site inform the user about the potential benefits of stopping tobacco use?	1. 0.	Yes No
5. Does the site help the user establish a quit plan:	1. 0.	Yes No
a. Does the site help the user establish a quit date?	1. 0.	Yes No
b. Does the site suggest that the user should recruit family and friend support?	1. 0.	Yes No
c. Does the site suggest that the user remove tobacco products from the environment?	1. 0.	Yes No
d. Does the site help the user anticipate challenges to a planned quit attempt?	1. 0.	Yes No
6. Does the site provide problem solving/skills training?	1. 0.	Yes No
7. Does the site include information on coping with withdrawal?	1. 0.	Yes No
8. Does the site provide appropriate information for recommending pharmacotherapy?	1. 0.	Yes No
9. Is online support provided?	1. 0.	Yes No
10. Does the site provide external links/resources?	1. 0.	Yes No
11. Are strategies for successful maintenance and avoiding relapse presented?	1. 0.	Yes No
12. Is the site easy to read?	1. 0.	Yes if < grade 7 No, if > grade 7

Time Finished: _____

Appendix 7 – Framework for Evaluation Criteria

Framework for Standard Evaluation Criteria

Criteria Addressed	Standard Criteria Question	Information Quality Tool Question	IQT Rationale/Purpose	Reason for Change
Credibility: Source	1. Is the author clearly identified?	1. Is the author clearly identified?	The source of information is the premier criterion for web site credibility and accountability. Provision of author identification promotes accountability for the information presented. There should be concern about the quality of information on a site that is provided by an anonymous source.	N/A Look to identify the authors because it makes them accountable for the information provides. You should be concerned about the quality of information on a site that is posted by an anonymous source.
Credibility: Source	2. Are the site author's credentials/qualifications clearly identified?	4. Are the site author's credentials listed?	Credentials, whether educational or experience-based, provide a gauge of the author's experience. Without this information it is hard to determine whether the author is qualified to provide such information. An author's experience can provide insight on a topic. If experience is not listed, it is difficult to judge the expertise of the author on that topic.	Grammatical changes created a more inclusive question. Credentials always strengthen the credibility of information. An author's credentials should be related to the topic if you are to give it any importance in your assessment.
Credibility – source; disclosure	3. Do the author's credentials and/or experiences relate to the knowledge of the field that is required for the site's subject discussions?	5. Does the site author's credentials relate to the knowledge of the field that is required for the site's subject discussions?	Good credentials strengthen credibility of information. An author's credentials should be related to the topic.	N/A Credentials, whether educational or experience-based, provide a gauge of the writer's expertise. Without this information it is hard to determine if they really should be providing this information.
Content - completeness	4. Can you determine who has paid for or sponsored the web site?	8. Can you determine who has paid for or sponsored this web site?	Funding for a web site should always be identified, especially from an outside source. Without sponsorship information, bias is difficult to identify.	No change.
Disclosure	5. When financial conflict or bias appears to exist, is there a statement of explanation?	9. Is any financial conflict or bias explained?	If a site is honest about where it gets its money or why it is biased it helps the user to determine how to use the information given. It is difficult to believe information found on a site if these conflicts or biases are not explained.	The wording was changed to allow for scoring of sites with no bias present.
Content: Disclaimer	6. Does the site provide a disclaimer statement indicating the limitations of the information posted on the site?	New question, not present on the IQT	N/A	Web site providers should provide appropriate warnings to users. Disclaimers should describe the limitations, purpose, scope, authority, and currency of the information available.

Criteria Addressed	Standard Criteria Question	Information Quality Tool Question	IQT Rationale/Purpose	Reason for Change
Interactivity – mechanism for feedback	7. Does the author provide contact information?	7. Is a means provided to contact the author directly?	Being able to contact the author allows the user to respond to the information provided. If unable to contact the author, users cannot obtain further information, address misunderstandings, or report errors.	The revised question allows for an assessment of the various levels of author contact available: by telephone, email, or post. Web sites that provide more than one method of content receive a higher score.
Disclosure – Privacy and data collection	8. Is there a privacy statement that addresses confidentiality and security of personal information	18. If you are allowed to input information or submit queries, is a statement provided that explains whether or not this information is confidential and secure?	An explanation of what will be done with personal information is very important. The IQT cautions users against providing personal information if they are unsure what it will be used for.	The revised question is a result of changes to the wording, and allows the web site reviewer to easily score the presence or absence of the criterion. A privacy statement should acknowledge the importance of privacy and their commitment to honour/exceed the legal requirements of health information privacy.
Disclosure – purpose	9. Are the purposes/objectives clearly stated?	New question, not present on the IQT	N/A	The Health Summit Working Group identified the acknowledgement of purpose/aim of a web site as an important criterion for judging quality, yet this was not addressed on the IQT.
Design: Navigability	10. Is a site map provided?	New question, not present on the IQT	N/A	A site map is an additional tool for navigating a web site, not addressed by the IQT.
Design: Navigability	11. Is a search engine provided?	20. Is a search engine provided?	A search engine enables users to find information more easily.	N/A
Design: Internal Search Capability	12. Do the search tools provided assist you in using the site?	21. Does the search engine assist you in using the site?	Not only are search tools that are not comprehensive or incorrect not useful, they also indicate that a site may not be well updated.	Minor changes were made to the question to include the assessment of search engines and site maps.
Design: Navigability	13. Is the site easily navigable and presented in an organised manner	19. Is the site easily navigable and presented in an organised manner?	An organised site makes it easier to find what information, and may indicate more work went into the development of the site.	N/A

Criteria Addressed	Standard Criteria Question	Information Quality Tool Question	IQT Rationale/Purpose	Reason for Change
Interactivity: Communication Media	14. When information exchange between users is available is there a moderator present?	New question, not present on the IQT	N/A	The Health Summit Working Group identifies interactivity and methods of communication with other web site users as an important criterion for quality, yet this is not present on the IQT.
Content: Accuracy	15. Can factual information be verified through footnotes or bibliographies to other sources?	2. When the author refers to another source, are appropriate references provided?	References for the source of information are necessary for users to identify the origin of the information presented. If unable to check up on the sources, doubts are created about the truthfulness and/or validity of the information.	Changes were made to the wording of the question to include references to all factual information, and does not necessarily include common knowledge. References for the source of the information are necessary for you to identify where the information is coming from. Like a reporter, if you are not given a way to check up on the sources that were referenced, you create doubts about the truthfulness of
Content: Accuracy	16. If publications or sources are referenced, is the information: in popular press; in peer-reviewed literature only; both; neither; does not apply	New question, not present on the IQT	N/A	This question was added to judge the level of information provided.
Content – Completeness	17. If the author is not referring to a source when making a claim, does he/she clearly state that it is his/her opinion?	3. If the author is not referring to a source, does he/she clearly state that is only his/her opinion?	If a source is not cited, then it should clearly state that the information is only based on opinion and not necessarily based on sound research.	The words "when making a claim" were added to the question to ensure clarity. If a source is not cited, then it should clearly state that the information is only based on opinion and not necessarily based on sound research.
Credibility – Currency	18. Is there a means to determine how current the information is?	11. Is there a means to determine how current the information in the web site is, for example, the date of last update or posted date.	A date is necessary to judge the timeliness of information; sites should indicate when they were last updated. Disclosure of the last date of update does not imply that the information is correct, but serves as an indicator of currency.	N/A

Criteria Addressed	Standard Criteria Question	Information Quality Tool Question	IQT Rationale/Purpose	Reason for Change
Credibility - Currency	19. Is the information still current?	12. Is the information current?	If a date of last update is specified, that date should be current. If not, the information may no longer be valid.	The definition of "current" could vary according to the topic under study. For the purposes of this study, "current" was defined as any update during the previous 12 months.
Credibility - Currency	20. Is the information still relevant?	13. Is the information still relevant?	Medical information that is no longer relevant can be very dangerous. Because of this, information provided should always be kept up to date.	N/A
Content	21. Is the information balanced and unbiased?	15. Is medical information presented in a balanced and neutral form?	All sides of a story should be told, not just one. A site that provides unbalanced information most likely has a bias (hidden or open).	Minor changes were made in the wording of the question to create a more general question. This study is not specifically examining the quality of medical information, rather health information.
Content	22. Does the site give good health behaviour change information?	14. From your own knowledge and experience, does this site give good medical information?	A site that does not provide good or truthful medical information can be very dangerous.	Changes were made to the wording of the question to create a more relevant question, given the study topic and purpose - behaviour change.

Appendix 8 – Framework for Evidence-based Criteria

Checklist Question	NCI Recommendations for Self-help Interventions:	Operational definitions, derived from US Clinical Practice Guidelines for Treating Tobacco Use and Dependence
1. Does the site inform the user of acute risks of smoking cigarettes?	At minimum, any self-help intervention should: include information about the health and social consequences of smoking	Web site identifies the potential negative consequences of tobacco use. There are several short-term risks associated with tobacco use. Acute risks are the immediate effects of tobacco use. The following list is not exhaustive, but is referred to in the Clinical Practice Guidelines <ul style="list-style-type: none"> • shortness of breath • exacerbation of asthma • harm to pregnancy • impotence • infertility • increase of serum CO
2. Does the site inform the user of long-term risks of smoking cigarettes?		There are several long-term health risks associated with tobacco use. Long-term risks are often manifested into disease after several years of smoking. The Clinical Practice Guidelines refer to: <ul style="list-style-type: none"> • Lung and other cancers (larynx, oral cavity, pharynx, oesophagus, pancreas, bladder, cervix) • heart attack and stroke (cardiovascular disease) • Chronic obstructive pulmonary diseases (chronic bronchitis and emphysema) • Long-term disability and need for extended care
3. Does the site inform the user of environmental risks associated with smoking cigarettes?		The Clinical Practice Guidelines refer to potential environmental risks, including <ul style="list-style-type: none"> • Increased risk of lung cancer and heart disease in spouses • Higher rates of smoking by children of tobacco users • Increased risk for low birth weight, SIDS, asthma, middle ear diseases and respiratory infections in children of smokers.
4. Does the site inform the user about the potential benefits of stopping tobacco use?		Web site identifies potential benefits of stopping tobacco use. There are many benefits to quitting smoking. Some include: <ul style="list-style-type: none"> • Improved health • Better sense of taste • Better sense of smell • Saving money • Improved self-confidence and self-esteem • Healthier babies and children • Feel better physically • Perform better in physical activities • Reduced wrinkling/aging of skin
5. Does the site help the user establish a quit plan? 5a. Does the site help the user establish a quit date? 5b. Does the site suggest that the user should recruit family and friend support? 5c. Does the site suggest that the user remove tobacco products from the environment? 5d. Does the site help the user anticipate challenges to a planned quit attempt?	Include specific strategies and exercises for successful quitting	A "Quit Plan" is a collection of strategies that the smoker may use to enable quitting, such as setting a quit date, soliciting social support, anticipating challenges, and removing tobacco products from the immediate environment. .

Checklist Question	NCI Recommendations for Self-help Interventions: At minimum, any self-help intervention should:	Operational definitions, derived from US Clinical Practice Guidelines for Treating Tobacco Use and Dependence
6. Does the site provide problem solving/skills training?		Problem solving/skills training will address issues of importance for the smoker and how to cope with quitting, (i.e. identify what helped and what hurt in previous quit attempts), anticipating triggers and challenges/barriers to abstinence.
7. Does the site include information on coping with withdrawal?		Withdrawal is a combination of physical and psychological symptoms that follows discontinuance of nicotine use. Coping with withdrawal may include pharmacological or behavioural interventions. The web site identifies withdrawal symptoms and provides behavioural and pharmacologic suggestions for relieving symptoms.
8. Does the site provide appropriate information for recommending pharmacotherapy?		Appropriate information should provide an explanation on how medications increase smoking cessation success and decrease withdrawal symptoms. Pharmacotherapy, in the form of nicotine replacement of bupropion SR, is recommended to all smokers trying to quit except in the presence of special circumstances. Smokers with medical contraindications, those smoking fewer than 10 cigarettes/day, pregnant or nursing women, and adolescents require special consideration for NRT.
9. Is online support provided?		Online support may include email inquiries, chatrooms, or supervised chatrooms. Online support should directly address behaviour/addiction problems rather than technical problems.
10. Does the site provide external links/resources?		Sites should provide external links and or resources to federal, provincial, or, non profit agencies. Ideally there should be opportunity to access culturally/educationally/age appropriate material. Web site provides supplementary materials in the form of external links or a list of relevant resources.
11. Are strategies for successful maintenance and avoiding relapse presented?	include specific strategies for maintenance and avoiding relapse	On average, it takes 4-5 quit attempts before a smoker is successful. Relapse prevention interventions typically included training in identifying and coping with high-risk situations, confronting self-defeating beliefs and expectations about quitting, and providing booster sessions. (Ockene et al., 2000) The web site identifies problems that may threaten the users continued abstinence, and strategies for dealing with threats. Examples may include negative mood or depression, strong or prolonged withdrawal symptoms, and weight gain.
12. Is the site easy to read?	be easy to read	The information on the web site is provided at a reading level less than grade 7.