Evaluation Design/Planning and Methodology for the NIH Web Site—Phase I

Final Report

March 31, 2000

Abridged Version

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ACKNOWLEDGMENTS

This project, Evaluation Design/Planning and Methodology for the NIH Web Site—Phase I, was conducted by QRC Division of Macro International Inc. (formerly Quantum Research Corporation) for the NIH Office of Communication and Public Liaison and the Office of the Deputy Chief Information Officer as Task Order 10 under NIH Contract N01-OD-7-2114. Macro International Inc. and UserWorks, Inc. participated as subcontractors. Macro provided valuable expertise in content analysis and the customer service methodologies, including the pilot online focus group. UserWorks conducted the heuristic review and pilot usability tests of the NIH Web site. We also wish to thank those individuals who participated in the various methodology pilot tests.

QRC wishes to acknowledge the valuable assistance and support of Dennis Rodrigues, NIH OCPL, and Anna Perrone, NIH/ODCIO, who served as Task Leaders on this project. The Task Leaders provided insight into the early development of the NIH Web site, assisted with selection of pilot test respondents for the pilot surveys, and offered useful suggestions and comments throughout the project.

We hope NIH and the Institutes and Centers will find this Evaluation and Performance Measures Toolkit useful as they assess their respective Web sites.

Mary V. Look
Project Director

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1. EXECUTIVE SUMMARY

Effective health information dissemination strategies and services are essential to extend the value of the knowledge resulting from biomedical research. NIH's ability to fulfill its mission to discover and disseminate new knowledge leading to improved health for all Americans has been strengthened by the rapid development and accessibility of the World Wide Web.

The Web has become an essential tool supporting NIH's mission to disseminate health information to the public. That tool has matured to the point that it is now advisable to examine and evaluate the current state of the NIH Web site, identify its most important user populations, and learn how the Web site can be used most effectively and efficiently to meet the various needs of different user populations.

Web site evaluation can help NIH and the Institutes and Centers (ICs) be responsive to legislative mandates and Executive orders. It can also provide information to help manage information technology resources and respond to Government Performance and Results Act (GPRA) requirements in performance measures, goal setting and goal measuring, and customer service. Evaluation can also help serve NIH and IC missions by ensuring access of information to all segments of the Web-enabled public including those who are accessibility-challenged.

The Evaluation and Performance Measures Toolkit described in this document can be used to assess the effectiveness of any Web site. The specific methodologies used for an evaluation depend on what is already known about the site and its users, and the resources available for the evaluation. The methodologies can be summarized as follows according to the sequence in which they are likely to be used and what is learned from each:

- Background information
  - Document analysis
  - Literature review and Web site reviews
- Web site information
  - Site mapping
  - Webmaster and staff questionnaires
- Usability and accessibility issues
  - Heuristic review/expert panel
  - Usability testing
- User information
  - Web server log analysis
  - Email content analysis
- Customer service
  - Customer satisfaction questionnaire
  - Customer satisfaction focus group

The first steps are collecting background information and information about the characteristics of the site to be evaluated through document analysis, literature reviews, site mapping, and Webmaster questionnaires. To look at customer satisfaction, usability, and accessibility issues

and conduct focus groups, more specialized skills and knowledge are required. Each of these methodologies is more labor-intensive than the more automated tasks, but each provides high quality information and the evaluator has considerable control over the type of information collected.

The overall evaluation design focuses on the experience of the user and is organized around performance measures that can be used in preparing responses to Federal legislation and Executive Orders. Together, the evaluation methodologies are complementary in their focus on specific performance measures—extensiveness, customer service, effectiveness, and impact—that can be used to assess the Web site.

2. INTRODUCTION

This document describes the final evaluation design, methodologies, performance metrics, and data collection instruments that have been developed and pilot tested for assessing a Federal agency Web site. Collectively, these methodologies and data collection instruments will assist agencies in evaluating the effectiveness of their Web sites in meeting their missions. The recommended approaches will also assist them in responding to various Federal mandates regarding performance measurements and customer service, particularly in the area of providing consumer health information. The evaluation design focuses on the user's experience and is organized around four performance measures:

- *extensiveness,* including the services and information provided and number of users reached
- *customer service*, including responsiveness, the intuitive provision of content, and user satisfaction with the design and content
- *effectiveness*, including Web site usability and the availability of the site to accessibility-challenged users
- *impact*, including benefit to users, comparisons with other sources of health information, and effects on attitudes or behavior

The evaluation approaches developed and tested encompass five investigative methodologies that serve as background or preparatory methodologies for the evaluation, and five user-centered methodologies that directly inform the evaluation effort. They provide a practical suite of tools that are complementary in their focus on evaluating the Web site on specific performance measures. This systematic, phased approach follows Hert and Marchionini's published review of the Bureau of Labor Statistics Web sites.[1]

Document analysis, literature and Web site reviews, and site mapping help the evaluator understand the purposes for which the site was developed, identify other similar sites, and understand the characteristics and structure of the existing site. A survey of Webmasters and other staff involved in Web site administration can provide more detailed information about the hardware and software environment and the processes and resources used to maintain the Web site. The final investigative methodology, an expert critique, is conducted by usability professionals and provides the initial usability information about the Web site.

Once the preliminary investigative phase is completed, usability tests, transaction log analysis, email content analysis, focus groups, and customer satisfaction questionnaires provide important information from and about Web site users. The expert critique, conducted in the investigative phase, is also used to identify scenarios or representative tasks for test subjects in the usability tests. Transaction log analysis provides insight into who is using the Web site and how they are using it. Email content analysis is used to review and systematically classify and analyze comments and requests submitted via email by Web site users. Customer satisfaction is measured and analyzed through both focus groups and questionnaires.

[1] Carol A. Hert and Gary Marchionini. *Seeking Statistical Information in Federal Websites: Users, Tasks, Strategies, and Design Recommendations.* July 18, 1997. http://ils.unc.edu/~march/blsreport/mainbls.html

Together, the design, performance measures, and methodologies comprise an Evaluation and Performance Measures Toolkit that can be used to evaluate Federal agencies' Web sites.

3. INVESTIGATIVE METHODOLOGIES

3.1. DOCUMENT ANALYSIS

To the extent that they are available, the identification and review of existing documents can help the Web site evaluator understand several key items: the purpose and original conceptualization of the site; the stakeholders that should be interviewed or surveyed; the documents that have been cleared for publication on the site (and which may or may not have been published); and the target audiences of the site. Documentation of a Web development effort is likely to be in the form of email messages, minutes from Web committee meetings, and handwritten notes in individual committee members' files.

3.2. LITERATURE AND WEB SITE REVIEWS

A review of the current literature on Web site evaluation and reviews of sites with similar missions can help identify successes from which Web designers and Web content developers can learn. At the time of this Phase I study, several pieces of Federal legislation and Executive Orders are relevant to the development and management of Federal Web sites:

- **Clinger-Cohen Act.—**The Information Technology Management Reform Act (ITMRA, also known as Clinger-Cohen) is intended to address the management of information technology in the Federal government. http://www.itpolicy.gsa.gov/mke/capplan/cohen.htm

- **Government Performance and Results Act of 1993 (GPRA).—**GPRA seeks to improve the effectiveness, efficiency, and accountability of Federal programs by mandating that Federal agencies set strategic goals, measure performance, and report on the degree to which those goals are met. http://www.npr.gov/initiati/mfr/

- **Executive Order #13011, Federal Information Technology.—**This Executive Order links the ITMRA, the Paperwork Reduction Act (PRA), and the GPRA. It formalizes the Office of Management and Budget's (OMB) oversight of information technology (IT) management and stresses the importance of accountability, mission- and performance-based planning, and implementation of Federal IT. http://www.whitehouse.gov/search/executive-orders.html

- **Executive Order #12862, Setting Customer Service Standards.—**This Executive Order defines the standard of quality for services provided to the public as "customer service equal to the best in business" and requires all executive departments and agencies that provide significant services directly to the public to develop and meet service standards. http://www.whitehouse.gov/search/executive-orders.html

- **Section 508 of the Federal Rehabilitation Act of 1973, as amended (1998).—**This section of the Act requires that when Federal agencies develop, procure, maintain, or use electronic and information technology, they must ensure that it is accessible to people with disabilities, unless it would impose an undue burden to do so. Federal agencies that provide information to the public or to their employees through Web sites must ensure that such sites are available to all persons with Internet or intranet access, including persons with disabilities.

http://www.access-board.gov/eitaac/section-508-q&a.htm
http://www.usdoj.gov/crt/508/508home.html

In addition, a Web site evaluation study should include a review of current standards and evaluation criteria. At the present time, there have been several efforts to establish evaluation criteria and development standards for public health information Web sites. The most notable is the Health on the Net Foundation Code of Conduct (HONcode) for medical and health Web sites at http://www.hon.ch/HONcode/Conduct.html.

Comprehensive Web site reviews are occasionally published. One of the most useful is the Hert and Marchionini (1997) study of the Bureau of Labor Statistics (BLS) Web site.[2] Hert and Marchionini evaluated the BLS Web site, Current Population Survey (CPS) Web site (co-sponsored by BLS and the Bureau of the Census), and the FedStats Web site (sponsored by the Interagency Council on Statistical Policy). The objectives of the study were to "determine who uses these services, what types of tasks they bring to the sites, what strategies they use for finding statistical information, and to make recommendations for design improvements." The BLS study used a constellation of evaluation methodologies to address different aspects of the Web sites from both internal (developer) and external (user) stakeholder perspectives. The research was divided into two phases: an investigative phase and an analysis of user activities. During the investigative phase, Hert and Marchionini sought to clarify the objectives of the site and understand the organizational perspective of the site's history and development processes. They used five data gathering methods: literature and Web site reviews, expert critiques, site mapping, document analysis, and interviews. During the user activities phase, the investigators focused on collecting data specifically related to how users accessed the site, including online interviews and focus groups, content analysis of email requests, impressionistic analysis of online comments, usability tests, and transaction log analyses.

Undoubtedly, additional studies will continue to be conducted and published. An online bibliography of selected resources related to Web site evaluation can be found at http://istweb.syr.edu/~mcclure/Web.Eval.Bibl.May20.html. A full description of the literature and Web site reviews performed as part of this task is presented in Appendix A-1.

3.3. SITE MAPPING

A graphical representation of the document structure of a Web site provides an excellent overview of the site content and the relationships among the documents. To map a Web space, canonical domains are first identified using a link checker such as LinkBot Pro 4.1.[3] Preliminary investigation of the Web site (also known as spidering) using LinkBot and including all canonical domains will identify unique URLs. Once canonical domains are identified, they are entered manually to map the static pages on the Web space using a site mapping tool such as

[2] Hert, C. A., and Marchionini, G. 1997. *Seeking Statistical Information in Federal Websites: Users, Tasks, Strategies, and Design Recommendations*. Final Report to the Bureau of Labor Statistics. http://ils.unc.edu/~march/blsreport/mainbls.html.
[3] LinkBot is available from Tetranet Software (http://www.tetranetsoftware.com/linkbot).

PowerMapper Pro.[4] LinkBot and PowerMapper were selected for the pilot test based on their cost and features; other software products are available to perform the same tasks. New products are likely to become available in the future.

PowerMapper's engine is a Web crawler that analyzes site structure by collecting links from each page it visits, and using these links to find new pages to visit. The information gathered by the Web crawler is analyzed to deduce site structure and then made into a map. Each map comprises a GIF and HTML image map. Once the software is installed and mapping is initiated, it is fully automatic and runs in the background with no user intervention.

PowerMapper can reach any site that a Web browser can. Supporting proxies and firewalls is accomplished by using the browser's configuration settings. PowerMapper fully supports current and proposed robot exclusion standards. It does not follow links outside the chosen site, and requests each page just once. To speed up mapping and reduce server load, it analyzes pages as they are loaded. It accepts pages produced by hand, CGI script, or any authoring tool, and copes with a wide variety of HTML coding errors. The code generated for maps is fully compliant with HTML 3.2.

During site mapping, PowerMapper checks page content and structure and indicates any problems in the map. Common errors detected include broken links, HTML errors, server errors (based on timing out due to a broken CGI script or similar problem), and errors in page titles (e.g., duplicated page titles).

Results are presented in several map styles that can be customized. The PowerMapper editor displays site structure in a Windows Explorer-style or Macintosh Finder-style tree view alongside each map. Other types of diagrams, such as cloud maps and flow charts are also available. These diagrams show where pages lie in the overall structure.

3.4. WEBMASTER AND STAFF SURVEY

Data collected directly from staff involved in Web site administration can provide a picture of the performance of Web technology and the Web development process, and the resources expended. QRC developed a multi-segmented questionnaire with skip patterns that allows selective responses from individuals who have specialized knowledge about various aspects of Web site development and administration. The data collection instrument consists of questions in six sections:

- Contact information
- Web server hardware and/or operating system software
- Web server software
- Networking or connectivity to the Web server

[4] PowerMapper Pro is available from Electrum Multimedia (http://www.electrum.co.uk/index.htm).

- Publication of static Web content, such as "pure" HTML pages
- Publication of dynamic Web content, such as multimedia, CGI-scripted, or database- or program-generated pages

A sample questionnaire is provided in Appendix A-2.

After reviewing several similar products, Decisive Survey 2.0 was selected for its ease of use in implementing the survey and collating and analyzing the results.[5] Other commercial online survey authoring software is available and new products will undoubtedly be produced.

Decisive Survey provides a graphical interface for creating the survey questionnaire in a Windows or NT environment and automatically converts it to either a Web page or an email message, depending on the distribution method. The Webmaster survey was designed and pilot tested as a Web-based survey.

As the first step of the Webmaster and staff survey, individuals identified by the Web site evaluator during the document review and analysis or from interviews are emailed an invitation to participate. The invitation should clearly state the purpose of the evaluation and the questionnaire, how responses will be treated with respect to confidentiality, and the release and due dates of the survey. To respond to the questionnaire, the pilot testers fill in the requested information and click on the Submit button on the Web page. This emails the responses back to the Web evaluator. The software attaches a CGI script to the Web questionnaire that returns email responses automatically from the Web site when the submission button is clicked. As responses are received, Decisive Survey collects and reads them, extracts the data, and processes it. Open-ended responses, such as comments, are also captured for review. The survey software provides the option of presenting statistical results in tabular format.

3.5. EXPERT CRITIQUE

Heuristic usability evaluations (also called "expert reviews" or "usability audits") are an efficient method of assessing a Web site for usability. This methodology provides for one or more usability professionals who are familiar with industry best practices in user interface design to evaluate an application or an entire Web site based on recognized rules of thumb. The objective is to identify possible difficulties that site users may have with the current interface and to recommend design improvements.

Heuristic evaluation of a Web site by a small group of experts can provide the first indication of areas for improvement and indicate what is likely to be most effective on the site. Guidelines for conducting a heuristic usability evaluation and a sample checklist are provided in Appendix A-3. The guidelines discuss the differences between heuristic evaluations, compliance reviews, and validation evaluations; personnel considerations; time required to conduct the evaluation; when to conduct the evaluation; design rules of thumb; conduct of the evaluation; and documentation of the results.

[5] Available from Decisive Technology, 1991 Landings Drive, Mountain View, CA 94043. See http://www.decisive.com/html/resource/survey.htm.

It is important to distinguish between heuristic evaluations of a Web site user interface and other types of design reviews. Heuristic evaluations focus on established design rules. Typically, the emphasis is not on comprehensively examining the functionality of the site. More often the review is conducted in the context of typical user tasks or "use cases." The emphasis is on providing feedback to the site's developers on the extent that the "look and feel" seems consistent with industry best practices and is likely to be compatible with the intended users' needs and preferences.

While a review conducted by one usability expert can provide very valuable information about a Web site, a panel of independent experts can offer the combined expertise of individuals with different points of view. Within the past few years, Web usability research has begun to expand beyond classic Human-Computer Interaction (HCI) research. While HCI continues to provide the foundation for usability research, other related disciplines offer insight into areas that directly affect the success of a Web site. These include:

- Information architecture and information design
- Accessibility and assistive technology
- Usability and marketing or branding

Leaders in each of these related disciplines should be considered as candidates for an expert panel. Avenues for identification of panel members include:

- Experts recommended by local institute or agency Web groups or committees, or other staff
- Members of the local usability community in universities and private organizations, such as Dr. Ben Schneiderman, director of the Human-Computer Interaction Laboratory at the University of Maryland or Dr. Richard L. Horst, president of UserWorks, Inc.
- Authors of usability reviews identified in literature and Web site reviews
- Nationally well-known usability experts such as Jakob Nielsen, Donald Norman, and Jared Spool

The expert panel can serve as a review board, performing a heuristic analysis of the Web site and developing design recommendations based on that review, or they can play an advisory role throughout the Web site review process, involved iteratively throughout the various stages of review. Three or four reviewers should be sufficient to identify most of the design problems in a Web site. Unlike usability testing, described in section 4.1, expert reviewers can assess all or most of a Web site. The panel members should be familiar with industry best practices in user interface design and evaluate the site based on recognized "rules of thumb." Each expert should independently review the Web site, using a standard set of heuristics (see Appendix A-3 for an example). Each reviewer develops his or her own approach and "use cases" or task scenarios to test the site, and submits a written report of the analysis, identifying the likely frequency and severity of problems. The panel is then convened to discuss their reviews and prepare a single final report and set of recommendations.

3.6. SUMMARY OF INVESTIGATIVE METHODOLOGIES

The investigative methodologies provide background information, structural and functional information about the Web site, and information about usability and accessibility deficiencies. Some approaches are relatively automated (e.g., site mapping), while others vary in their degree of manual involvement.

Document analysis provides background information about the development and purposes of the site. The availability of information will vary, depending on whether the process was systematically documented. The need for the information will vary, depending on the longevity of involvement of the current Webmaster and other Web site development and maintenance staff. The literature and Web site reviews available represent a body of knowledge that is growing, but which may be adequate without any augmentation, depending upon the Web site evaluator's needs and the amount of time elapsed since preparation of this report.

Site mapping and Webmaster questionnaires provide information about the structure and function of the Web site. The need to use these tools depends on the knowledge the Web site evaluator has about the site being evaluated. Current site maps may exist. Likewise, a well-informed Webmaster may have up to date information about hardware, software, development and maintenance activities, levels of effort, and other details of the site.

Once the investigative methodologies are employed as needed, the Web site evaluation should collect information from and about the site's users—who they are, the information they are seeking, the questions they are asking, the usability and accessibility challenges they face, and their satisfaction with the Web site. These are the user-centered methodologies.

4. USER-CENTERED METHODOLOGIES

4.1. USABILITY TESTS

Unlike the expert critique, usability tests are conducted using representative Web site users. Users are systematically observed as they perform realistic tasks like searching for information or otherwise utilizing the functionality of the site. The tests are typically conducted by a human factors engineer or other usability professional using a script of test scenarios developed from information obtained during the heuristic review. Such tests produce high quality data and can reveal the extent to which a Web site or application meets users' needs, and the extent to which it can be readily used and/or learned. The test is often conducted in a laboratory setting with audio-video equipment to record and measure performance; however, such equipment is now available in portable units that can be taken into most workplaces or field settings. Typical measures that are utilized include:

- the incidence of various usability problems (derived from observations of performance or user comments)
- the time required to accomplish specific tasks or subtasks
- the nature and incidence of various user errors or failures to accomplish tasks
- subjective ratings of user satisfaction along various design dimensions

A typical process for conducting a usability test would include the following steps:

Planning the Test.—The Test Administrator becomes acquainted with the Web site, and through a heuristic review identifies specific usability issues. With the assistance of the Web site developer or Webmaster, the Test Administrator defines the test objectives and clarifies the performance measures to be used. The Test Administrator then develops the experimental design, and determines the number and characteristics of participants required for the test and the appropriate configuration of recording equipment to be used (if any).

Preparing the Test.—The necessary equipment, both that which the participant will use and any observational recording equipment to be utilized, is set up, the materials to be used are readied, and the participants are recruited and scheduled. Test participants are typically offered an honorarium. The materials needed typically include task scenarios (i.e., the tasks to be accomplished by the test participants), notes for briefing and debriefing the participants, and any questionnaires to be used to gather demographic information from participants or quantify their perceptions of the site. Often a coding scheme is devised to facilitate the collection of observational data with regard to specific behaviors, events, or expected participant comments.

Data Collection.—Test participants are typically observed individually for approximately 1.5 hours as they attempt to accomplish the pre-defined tasks. The sessions are usually videotaped; a real-time, scan-converted image of the users' computer screens can be particularly informative. Depending upon the purposes of the test and the usability challenges that are anticipated, the Test Administrator may observe relatively unobtrusively or may carry on a running dialog with the test participant to obtain user feedback on various design issues. Of interest may be the participants' performance, how they go about accomplishing the tasks, and their comments as

they proceed. The data collected can consist of notes, documentation of the time taken to accomplish various tasks, such as a search for specific information, and participant questionnaire responses. A data logging software package may be used to facilitate the collection of time-stamped observational notes.

Analysis.—Depending upon the objectives of the evaluation, the analysis phase may involve compiling and categorizing the usability problems observed, transferring the data logs to a database package or spreadsheet in order to better summarize the coded observations, or calculating summary statistics on the subjective ratings data collected. Audio and video recordings of the test sessions can be reviewed as needed. Typically, an attempt is made to categorize the severity of the usability problems that emerged, taking into account the effect on user task performance, incidence, and frequency of occurrence of each problem.

Reporting.—The usability test objectives, methods, results, and any design recommendations are documented in a written report. Design change recommendations for improving the Web site are offered as needed. Often the suggested design changes involve screen design or informational architecture. However, some problems can also be addressed in online help or user documentation, by briefing help desk personnel (i.e., call center technical support), or in user education programs. If sufficient cost estimates and return on investment data are available, a cost-benefit analysis of alternative means for dealing with design deficiencies may be helpful in deciding how to ameliorate the usability problems observed.

Usability testing was pilot tested with 10 representatives of the Web-using public who might visit the Web site seeking information on specific health topics or about the agency itself. Recruited from among three subgroups of the general public, test participants included an equal number of females and males and a mix of age groups and educational attainment. Test participants also included accessibility-challenged individuals (one vision-impaired, one motor-impaired, and two learning disabled: one with dyslexia and one with attention deficit disorder).

The test plan prepared for the usability testing is provided in Appendix A-4 as a guide for Web site evaluators. Additional documents used in the usability pilot test are provided in Attachments A through D in Appendix A-5. These include:

- the screening interview/questionnaire for qualifying and selecting candidate participants (Attachment A)
- the background and demographics questionnaire to document participant profiles (Attachment B)
- the informed consent and permission form for videotaping (Attachment C)
- the Test Administrator's facilitator's guide, including participant instructions, task scenarios and the user satisfaction questionnaire (Attachment D)

Besides initially seeking information about a self-selected topic, usability test participants would be asked to select (one at a time) from a list of other tasks until the time allotted for testing had elapsed. These tasks might include:

- searching for a news story about _____ information
- locating budget information
- finding a summer job for a high school student
- finding information about and directions to a lecture at [institute or agency name]
- locating a toll free number for _____ information

Usability testing includes users' overall impression of the site's home page and an assessment of navigation, including both the "search" option and following the structure of the site. Test procedures are adapted as needed to the special circumstances of accessibility-challenged test participants. After each task, test participants are asked to rate, on a scale of 1 to 9, the ease or difficulty of navigation and the ease or difficulty of understanding the content of the material they found.

4.2. TRANSACTION LOG ANALYSIS

Analysis of Web server transaction logs provides comprehensive information about Web server traffic. Typically conducted as an automated procedure with log analyzer software, all activity of the Web server is logged, including data such as the IP address and/or domain of the individual requesting a Web page from the server, the date and time the request was made, the filename of the page accessed, and the number of bytes of data served.

QRC selected WebTrends Log Analyzer, which is a Windows 95/98/NT application designed to manage, report, and analyze multiple Web Servers and log files.[6] WebTrends was selected for the pilot test based on cost and features; other software products are available to perform the same tasks. New and better products will likely become available in the future. Using WebTrends, log analysis and reporting are performed in real-time or on demand, and can accommodate more than 30 types of log files. WebTrends does not require importing the log file to a database because the analysis is performed on the log file itself. The log files analyzed by WebTrends may reside on a local drive, network drive, ODBC Database, FTP server, or HTTP (Web) server. Results are stored in a database, and reports can be created in Microsoft Word or Excel, text and comma-delimited formats, or can be created in HTML format and made available online. WebTrends can process server log files as large as 30 GB, enabling analysis of long-term server logs spanning months or even years.

For pilot testing transaction log analysis, log records from a 1-month period were selected by the client and transmitted electronically to QRC. Following the standard software instructions and using the WebTrends package of analysis tools, reports were published as HTML pages with charts and tables of statistics that could be selected from a menu.

4.3. EMAIL CONTENT ANALYSIS

Email messages containing comments, questions, and feedback on a Web site provide valuable insights into the kinds of informational needs users have and the types of problems they

[6] See http://www.webtrends.com for more information.

encounter with the site. Content analysis is a method used to categorize and analyze textual information, such as email messages.[7] Content analysis is a technique used to classify sets of words (textual or verbal) that relies on the judgment of an analyst or group of analysts who seek to find patterns in the data. Rigor is introduced into the methodology through the measurement and emphasis on reliability and the replicability of observations and subsequent interpretations.

Every month, the agency's team of information specialists responsible for processing email messages regarding comments, questions, and feedback receives several hundred email requests from the public. To better understand users' needs and experiences, a content analysis of questions submitted via emails was performed as a pilot test of this methodology. Appendix A-6 provides a description of the sample selection of emails and the development and application of the coding scheme. Although it is important to note that these email requests represent a self-selected sample of the overall Web site user population, the results of this analysis should position Web designers and Web content developers to better anticipate users' needs and minimize possible problems they may encounter.

The main issue to consider when conducting an email content analysis is the derivation of a content analytic coding scheme. This should include developing the categories, creating the dimensions needed to understand the nature of a particular message (i.e., question), and assigning the coding rules to be used for each email message.

The following procedures were followed during the pilot email content analysis:

Develop coding scheme.—For the pilot test of this methodology, samples of user email requests for information were obtained. The samples, representing 3 consecutive months' of emails, contained 1,629 separate messages in 3 large text files. To inductively develop the taxonomy for content analysis, a sample of about 5 percent of the emails (86 emails) was read and the categories were preliminarily developed. If an email message contained more than one question, each was coded separately. Once it was apparent that no new categories were being added, the preliminary scheme and associated coding rules were formalized.

Test sample against the coding scheme.—A second analyst then received the scheme and both analysts coded the same subset of messages. Coding decisions were jointly reviewed to confirm that the scheme was detailed enough for any coder to reach the same decisions. At two separate points in time during the coding, the analysts compared their findings to ensure the reliability of the coding. When they were relatively confident of the reliability, they coded the remaining emails.

Calculate inter-rater reliability.—After the original sample of 86 emails had been coded, inter-rater reliability using Cohen's kappa statistic was calculated. Kappa considers the number of decisions made and the expected occurrence of agreement if chance alone was operating. This step verified reliability on the three dimensions (content, strategy, and requestor) of the coding

[7] Standard references on content analysis methodology include: Holsti, O.R. 1969. *Content Analysis for the Social Sciences and the Humanities.* Reading, MA: Addison-Wesley and Krippendorf, K. 1980. *Content Analysis: An Introduction to Its Methodology*. Beverly Hills, CA: Sage Publications.

scheme. A value of .60 or higher is generally considered sufficient to indicate that chance alone is not accounting for the agreement between coders. For all three dimensions—content, strategy, and requestor—the value was .72 or higher.

Code second sample.—Once the coding scheme and rules were established, an additional 10 percent of the emails were sampled and coded (for a total of 162 emails and 208 questions). This sample was drawn equally from each of the 3 months' emails. The results were analyzed by summarizing the emails on all three dimensions, including content categories, question strategies, and type of requestor.

Tabulate results.—The percent of questions were separately tabulated by content, strategy, and requestor and by combinations of the three dimensions.

A detailed summary of the email content analysis methodology is provided in Appendix A-6.

4.4. CUSTOMER SATISFACTION FOCUS GROUPS

The flexible environment of a focus group provides subjective feedback and adds a dimension of research that is not available from other sources. Focus groups are also an excellent source of information on why people make certain decisions, how they arrive at decisions, and how they might respond in proposed situations. QRC pilot tested a customer satisfaction focus group through an online method rather than as a traditional face-to-face group. This methodology is particularly appropriate for topics that relate to technology, such as Web sites and online databases and information sources.

Conducting customer satisfaction focus groups online obtains the same information as face-to-face focus groups, and produces other benefits. Anyone in the world with a computer, Web browser, and Internet access can participate, moderate, or administer. State, regional, and national boundaries are eliminated; in a typical focus group, participation would be limited to an immediate local area. Comments are often more thoughtful and useful, and a transcript is automatically produced, eliminating many hours of labor needed to transcribe recorded conversations. Online focus group participants must obviously have a basic level of computer literacy, but this is appropriate since our topic is dealing with a Web site and online health information sources.

A typical process for conducting an online customer satisfaction focus group would include the following steps:

Recruitment.—The moderator works with the client (e.g., institute or agency Webmaster or Information Officer) to determine the user population from which to recruit the online focus group members. Text for a recruitment screener (i.e., a Web page) is developed, and the Webmaster places a link to the screener on the institute or agency Web site. The responses are monitored, and a followup email is sent to qualified and interested individuals. A test login site is set up, and potential participants then attempt to login. Finally, a reminder email is sent the day before the focus group is scheduled to those participants who have successfully completed the test login.

Preparation.—The moderator develops a guide, online presentation materials, and an online feedback survey for the focus group. Within one week of the focus group, a walk-through is conducted with the administrator, the moderator and a few "dummy" participants. This ensures that the system is functioning, and allows a chance to review the materials and procedures one last time. Also during this time, test logins may be conducted by anyone wanting to observe the online focus group "silently."

Implementing the Online Focus Group.—A Web-integrated, real-time chat solution, such as iChat, is used to conduct online focus groups. This software allows individuals and groups of users across the world to talk to each other in virtual space using the Internet. Prior to the start of the online focus group, an introductory slide is placed on the site for participants to read as they log in. The moderator welcomes participants and observers, and specifies the ground rules. At the assigned time, the online focus group begins with group members introducing themselves. The online focus group is conducted in the same manner as a face-to-face focus group (i.e., the discussion is moderated, and everyone is given a chance to provide input to the questions). Following the online focus group, a complete transcript is produced and edited. An online feedback survey administered at the conclusion of the focus group session. Survey results are tabulated and a final written analysis is produced.

The online focus group methodology was pilot tested with 10 participants. A summary of the process for conducting an online focus group, including the recruitment message, screening questions, and moderator's discussion guide, can be found in Appendix A-7. During the pilot focus group session, the moderator guided the discussion using the moderator's guide and an assistant moderator helped keep track of the queue. Both a structured format and an open discussion format were used in the pilot test. Several additional individuals logged in as silent observers from remote locations. These individuals simply observed; they did not participate in the process. Following the pilot test, a complete transcript was automatically generated for review and analysis by the moderator.

4.5. CUSTOMER SATISFACTION QUESTIONNAIRES

The use of online surveys is a cost-effective way to gather Web site customer satisfaction information from a large and geographically dispersed population. A Web-based questionnaire can assess customer satisfaction with the Web site and many of the issues explored in the customer satisfaction focus groups.

Placement of the online survey is likely to be an important determinant of response rate and the types of respondents who participate. A sample selection of questionnaire respondents is non-random (self-selected), regardless of where a questionnaire is positioned on a Web site. Demographic information collected by the survey helps to characterize respondents, but care should be taken in generalizing responses to all Web site visitors.

The questionnaire results can provide information about the variety and characteristics of users participating in the survey, how they learned about the Web site, and how frequently they have used it. Questions can be designed to target user satisfaction with content and design, and to identify valuable new services and features that users may desire. Respondents can also provide

information about how the agency Web site under review compares to other Web-based sources of similar information.

The process for conducting an online customer satisfaction survey includes the following steps:

Development.—The survey instrument is developed based on research questions that have been identified. The questions are formatted using a Web-enabled survey software package. Placement of the survey is determined based on level of traffic through the site, as well as the survey objectives. Sufficient time must be allowed to obtain OMB clearance for the data collection instrument.

Implementation.—A link inviting participation in the survey is placed on the Web site and responses are monitored daily. Placement of the link may be adjusted based on the number of responses received from a given location. A pilot test period can help determine the best placement. The link and the data collection instrument (see Appendix A-8) should remain available until the desired number of responses is obtained. A total of 45 to 50 responses is usually sufficient.

Reporting.—After the data collection is complete and the survey is removed from the Web site, data are stored in database records for analysis. Closed-ended questions (e.g., scales and pick lists) are tabulated and summarized by category of respondent; open-ended questions are coded and categorized.

Off-the-shelf survey software (Decisive Survey 2.0) was used to format and conduct the pilot test survey. The software was selected for the pilot test based on cost and features; other software products are available. To set up a questionnaire and conduct a survey, software should minimally allow the user to:

- easily format and set up a survey comprised of several types of questions
- link the survey from the Internet or make it accessible via an email package
- easily create reports and export the data to other software for analysis and reporting

Another helpful feature of Decisive Survey 2.0 allows modification of the HTML code without affecting the setup and execution of the survey. For the pilot test, a 29-question data collection instrument was developed and entered into the survey software. This survey was set up on one of the contractor's servers so that participants could access and complete the survey from the location of their choice.

4.6. SUMMARY OF USER-CENTERED METHODOLOGIES

The user-centered methodologies provide information from and about Web site users regarding the usability and accessibility of the site, user characteristics and interests, and customer satisfaction with the form and content of the site. As with investigative methodologies, the approaches vary in the extent to which they require the direct participation of the Web site evaluator. Web server log analysis is a relatively automated methodology. Two methodologies, usability testing and online customer satisfaction focus groups, require specialized knowledge,

skills, and equipment. The customer satisfaction questionnaire should use a well-constructed and pre-tested instrument.

Usability testing reveals the extent to which the Web site meets the users' needs and expectations, and the extent to which it can be readily used. It can also be used to assess the accessibility of the Web site to disabled or accessibility-challenged users. Individuals recruited to participate in usability testing should be selected from among members of the Web site's intended audience.

Web server log and email content analyses provide information about Web site users. Analysis of the server transaction logs provides information about the domain of the user and the most popular pages and access times. Email content analysis categorizes and summarizes messages from users to Webmasters or other individuals who are responsible for site content. Content analysis was pilot tested using questions submitted by users via email. The methodology can also be used to compile information about users' comments as well as staff responses to users' comments and questions.

Customer satisfaction surveys are used to collect information from a large and geographically dispersed user population. The customer satisfaction questionnaire collects subjective information in a primarily closed-ended format for easier analysis and reporting. The customer satisfaction focus group collects similar information in a format designed to obtain more qualitative data, which allows for real-time probing for additional information when required. When conducted online, customer satisfaction focus groups also collect information from a geographically dispersed user population.

Appendix A-9 summarizes the implementation details of the investigative and user-centered Web site evaluation methodologies.

4.7. OTHER EMERGING METHODOLOGIES

Several newer, cutting-edge tools that automate testing and assessment of Web site usability and accessibility are being developed. These include:

- Web Metrics, developed by the National Institute of Standards and Technology (NIST) as a suite of automated usability assessment tools. WebSAT checks the HTML of Web pages against a set of usability guidelines to identify potential problems to be investigated in usability testing. WebVIP is a remote usability testing tool that can be used with a given set of tasks, much like the test scenarios used in traditional laboratory-based usability testing. http://www.nist.gov/webmetrics

- Bobby, developed by the Center for Applied Special Technology (CAST). Bobby is an automated and cost-effective accessibility assessment tool. http://www.cast.org/bobby

- WAMMI (Web site Analysis and MeasureMent Inventory), a standardized Web questionnaire developed in Europe by the Human Factors Research Group, Cork, Ireland, and Nomos Management AB, Stockholm, Sweden. It consists of approximately 20 questions

that have been carefully selected to collect subjective ratings of a Web site's ease of use on a series of design aspects. The questions have been iteratively tested for reliability and validity on numerous Web sites. It can be used for monitoring users' experiences and benchmarking a Web site relative to other sites. An international database of results has been compiled and test results can be analyzed and compared with how users rate Web sites in general. http://www.nomos.se/wammi

5. PERFORMANCE MEASUREMENT

The investigative and user-centered methodologies provide a practical suite of tools and approaches that are complementary in their focus on specific performance measures that can be used to assess the effectiveness of a Web site. There is some overlap in the constructs that are measured by each methodology; multiple methodologies contribute to understanding and measuring a single performance metric and a single methodology can contribute to several performance measurements. The overall evaluation design focuses on the experience of the user and is organized around four performance measures. In sections 5.1 through 5.4, the performance measures are briefly described and the methodologies that can be used to understand each are listed. A matrix of methodologies and performance measures is provided in tabular form in Appendix A-10.

5.1. EXTENSIVENESS

This performance measure includes the extensiveness of the services and information provided and the users reached. The following methodologies can be used to understand and evaluate this performance measure:

- Document analysis—to identify and define the intended audience
- Site mapping—to illustrate Web site size, content, and organization
- Webmaster and staff questionnaires—to understand services provided and resources used
- Transaction log analysis—to identify domains of Web site users
- Email content analysis—to characterize Web site users based on the information they are seeking
- Customer satisfaction questionnaires—to characterize Web site users and where they are seeking specific types of information

5.2. CUSTOMER SERVICE

This performance measure includes institute or agency responsiveness or level of customer service, the intuitive provision of content, and user satisfaction with the design and content. The following methodologies can be used to understand and evaluate this performance measure:

- Webmaster and staff questionnaires—to determine use of resources, responsiveness to users, efforts to design and assess accessibility and/or usability, and how content is managed
- Expert review/expert panel—to assess usability of content
- Usability tests—to determine probable incidence and type of usability problems encountered by users
- Transaction log analysis—to determine responsiveness of Web server to users and use of search engine
- Email content analysis—to identify areas for improvement on basis of comments and questions

- Customer satisfaction focus groups—to assess user satisfaction with content and design; comparison with other similar sites
- Customer satisfaction questionnaires—to assess user satisfaction with content and design; comparison with other similar sites; to identify need for new services or content

5.3. EFFECTIVENESS

This performance measure includes an assessment of how well the Web site is meeting its mission and objectives. This assessment can include an evaluation of the availability of the site to accessibility-challenged users, whether users can find what they are looking for, and how the site compares to other sites with similar missions. The following methodologies can be used to understand and evaluate this performance measure:

- Document analysis—to identify individuals responsible for content and service; to identify purpose of Web site
- Literature and Web site reviews—to collect information on current standards and other similar sites
- Webmaster and staff questionnaires—to identify efforts to assess accessibility and usability, how content is managed, and resources used to serve content
- Expert critique/expert panel—to assess usability and accessibility of site to determine whether objectives and mission can be achieved
- Usability tests—to assess the extent to which the Web site meets users' expectations and is available to accessibility-challenged individuals
- Transaction log analysis—to identify "most popular" Web pages
- Email content analysis—to assess how well content and design match user needs, based on comments and questions received
- Customer satisfaction focus groups—to assess the extent to which users are finding the information they need and how the Web site compares with other sources of information
- Customer satisfaction questionnaires—to assess the extent to which users are finding the information they need and how the Web site compares with other sources of information

5.4. IMPACT

This performance measure assesses the impact or benefit to the user, including comparisons to other sources of health information and effects on attitudes or behavior. This is the most qualitative and most difficult performance measure to assess. The following methodologies can be used to understand and evaluate this performance measure:

- Expert critique/expert panel—to assess the usability and accessibility of the Web site, both of which affect the benefit to users
- Email content analysis—to identify anecdotal evidence of benefit and possible effect on users

- Customer satisfaction focus groups—to identify and assess information and services that benefit Web site users and compare benefit with other similar sites
- Customer satisfaction questionnaires—to identify and assess information and services that benefit Web site users and compare benefit with other similar sites

6. CONCLUSION

The Evaluation and Performance Measures Toolkit described in this document can be used to assess the effectiveness of any Web site. The specific methodologies used for an evaluation depend on what is already known about the site and its users, and the resources available for the evaluation. The methodologies can be summarized as follows, according to the sequence in which they are likely to be used and what is learned from each:

- Background information
  - Document analysis
  - Literature review and Web site reviews
- Information about the Web site
  - Site mapping
  - Webmaster and staff questionnaires
- Usability and accessibility issues
  - Heuristic review/expert panel
  - Usability testing
- Information about the users
  - Web server log analysis
  - Email content analysis
- Customer service
  - Customer satisfaction questionnaire
  - Customer satisfaction focus group

The first steps are collecting background information and information about the characteristics of the site to be evaluated through document analysis, literature reviews, site mapping, and Webmaster questionnaires. These tasks require research, analytic skills, and technical skills that are likely to be present on Web development staffs. The site mapping and transaction log analysis methodologies are relatively automated, while the preliminary research, document analysis, and questionnaires require more effort.

To look at usability and accessibility issues and conduct focus groups, more specialized skills and knowledge are required. This is also true for performing a content analysis of the communication with Web site users. Each of these methodologies is more labor-intensive than the automated tasks, but each should provide high quality information and the evaluator has considerable control over the type of information collected.

The customer satisfaction survey is somewhat less specialized in the skills required, since model questionnaires may be available—including the one pilot tested in this project—and posting a survey on a Web site is not technically difficult.

The overall evaluation design focuses on the experience of the user and is organized around performance measures that can be used in preparing responses to Federal legislation and Executive Orders. Together, the evaluation methodologies are complementary in their focus on

specific performance measures—extensiveness, customer service, effectiveness, and impact—that can be used to assess a Web site.

APPENDIX A-1. LITERATURE AND WEB SITE REVIEWS

Reviews of the literature related to Federal information technology management and standards and evaluation criteria for informational Web sites can inform institute and agency efforts to develop "best in business" services. This document presents a brief review of Federal legislation and Executive Orders related to the development and management of Web sites; a review of several of the more prominent efforts to establish evaluation criteria and development standards for public health information Web sites; and a sample of several recent, broad-based Web site reviews that can serve as models.

1.1. FEDERAL LEGISLATION AND EXECUTIVE ORDERS

The information in the following paragraphs has been drawn in part from Charles McClure's paper "Selected Federal Information Policies Affecting the Development and Management of Web sites." In this document he identifies additional legislation and policies that may be relevant to Federal Web efforts, including:

- instructions on complying with President's Memorandum of May 14, 1998, "Privacy and Personal Information in Federal Records," which instructs agencies how to establish and enforce a privacy policy

- the Government Paperwork Elimination Act and its Proposed Implementation, which requires Federal agencies to give persons who are required to maintain, submit, or disclose information the option of doing so electronically, when practicable, by October 21, 2003

- the Electronic Freedom of Information Act, which amends the Freedom of Information Act to define "record" to mean information maintained by an agency, as a required agency record, in any format and mandates the creation of electronic reading rooms for all agency Web sites

1.1.1. CLINGER-COHEN ACT

The Information Technology Management Reform Act (ITMRA, also known as Clinger-Cohen) is intended to address the management of information technology in the Federal government. It is to accomplish this goal through a variety of methods, including the use of capital planning for IT acquisitions and investments, the establishment of Chief Information Officer (CIO) positions in Federal departments and agencies, and the requirement of performance measurements of IT. The Director of the Office of Management and Budget (OMB) is given ultimate responsibility for the oversight and management of IT acquired by the Federal government. See the following Web sites for text of the legislation and a summary prepared by NIH/CIT.
http://www.itpolicy.gsa.gov/mke/capplan/cohen.htm and
http://irm.cit.nih.gov/itmra/itmrasum.html

1.1.2. GOVERNMENT PERFORMANCE AND RESULTS ACT OF 1993 (GPRA)

GPRA seeks to improve the effectiveness, efficiency, and accountability of Federal programs by mandating that Federal agencies set strategic goals, measure performance, and report on the degree to which those goals are met. It is also designed to assist Congress and the Executive in their oversight, legislative, and administrative tasks related to authorizing, appropriating, and implementing Federal services. The adoption of a strategic and annual planning process is tied to the budget and authorization cycles and is to be based on established and measurable performance indicators for every program. See http://www.npr.gov/initiati/mfr/ for a discussion of the "managing for results" portion of the GPRA initiative and http://irm.cit.nih.gov/itmra/gprasum.html for an overview of GPRA.

1.1.3. EXECUTIVE ORDER #13011, FEDERAL INFORMATION TECHNOLOGY

This Executive Order links the ITMRA, the Paperwork Reduction Act (PRA), and the GPRA. It formalizes the OMB's oversight of IT management and stresses the importance of accountability, mission- and performance-based planning, and implementation of Federal IT. Executive Order 13011 also creates the Chief Information Officer Council, the Government Information Technology Services Board, and the Information Technology Resources Board. The full text of the Executive Order is available at http://www.npr.gov/library/direct/orders/27aa.html.

1.1.4. EXECUTIVE ORDER #12862, SETTING CUSTOMER SERVICE STANDARDS

Executive Order #12862, issued on September 11, 1993, defines the standard of quality for services provided to the public as "customer service equal to the best in business" and requires all executive departments and agencies that "provide significant services directly to the public" to:

(a) identify the customers who are, or should be, served by the agency;

(b) survey customers to determine the kind and quality of services they want and their level of satisfaction with existing services;

(c) post service standards and measure results against them;

(d) benchmark customer service performance against the best in business;

(e) survey front-line employees on barriers to, and ideas for, matching the best in business;

(f) provide customers with choices in both the sources of service and the means of delivery;

(g) make information, services, and complaint systems easily accessible; and

(h) provide means to address customer complaints.

Agencies must also publish a "Customer Service Plan," develop assessment techniques to gauge the success of the plan, and to report to the President on the degree to which the plan is being accomplished. More details are available at http://www.npr.gov/library/direct/orders/2222.html.

1.1.5. SECTION 508 OF THE FEDERAL REHABILITATION ACT

Section 508 of the Federal Rehabilitation Act of 1973, as amended in 1998, requires that when Federal agencies develop, procure, maintain, or use electronic and information technology, they must ensure that it is accessible to people with disabilities, unless it would impose an undue burden to do so. Signed into law on August 7, 1998 as part of the Workforce Investment Act of 1998, the amendments significantly expand and strengthen the technology access requirements. Federal agencies that provide information to the public or to their employees through Web sites must ensure that such sites are available to all persons with Internet or intranet access, including persons with disabilities. Persons with disabilities must have access to and use of information and services that is comparable to the access and use available to non-disabled Federal employees and members of the public. In general, an information technology system is accessible to persons with disabilities if it can be used in a variety of ways that do not depend on a single sense or ability. The Department of Justice's Web site on Section 508 is at http://www.usdoj.gov/crt/508/508home.html.

At the time Federal legislation and executive orders were reviewed for this task, the Access Board had not yet proposed accessibility standards for electronic and information technology acquired or used by the Federal Government. The Board's standards were originally due February 7, 2000. The standards, which will become part of the Federal Acquisition Regulation (FAR) once finalized, will help Federal agencies determine whether or not a technology product or system is accessible. These standards will define the types of technology covered and set forth technical and functional performance criteria necessary to implement the accessibility requirements. Both standards and the revised FAR are scheduled to be issued at the same time in August 2000. Currently, the Board's proposed standards are being reviewed by the Office of Management and Budget (OMB). The status of the OMB's review of the standards is posted on OMB's Web site at http://www.whitehouse.gov/library/omb/OMBREGS.HTM (click on "Architectural and Transportation Barriers Compliance Board").

1.2. STANDARDS AND EVALUATION CRITERIA

There have been several efforts to establish evaluation criteria and development standards for public health information Web sites. The best known of these is the HONcode project developed by the Health on the Net Foundation.

1.2.1. HEALTH ON THE NET FOUNDATION'S CODE OF CONDUCT

The Health on the Net Foundation <http://www.hon.ch> Code of Conduct (HONcode) for medical and health Web sites defines a set of rules designed to make sure the reader always knows the source and the purpose of the data viewed. Sites that abide by the Code of Conduct can display a graphic on their pages which lets visitors know that the site has been developed according to the HONcode Principles:

1. Any medical/health advice provided and hosted on this site will only be given by medically/health trained and qualified professionals unless a clear statement is made that a piece of advice offered is from a non-medically/health qualified individual/organization.
2. The information provided on this site is designed to support, not replace, the relationship that exists between a patient/site visitor and his/her existing physician.
3. Confidentiality of data relating to individual patients and visitors to a medical/health Web site, including their identity, is respected by this Web site. The Web site owners undertake to honor or exceed the legal requirements of medical/health information privacy that apply in the country and state where the Web site and mirror sites are located.
4. Where appropriate, information contained on this site will be supported by clear references to source data and, where possible, have specific HTML links to that data. The date when a clinical page was last modified will be clearly displayed (e.g., at the bottom of the page).
5. Any claims relating to the benefits/performance of a specific treatment, commercial product or service will be supported by appropriate, balanced evidence in the manner outlined above in Principle 4.
6. The designers of this Web site will seek to provide information in the clearest possible manner and provide contact addresses for visitors that seek further information or support. The Webmaster will display his/her email address clearly throughout the Web site.
7. Support for this Web site will be clearly identified, including the identities of commercial and non-commercial organizations that have contributed funding, services, or material for the site.
8. If advertising is a source of funding it will be clearly stated. A brief description of the advertising policy adopted by the Web site owners will be displayed on the site. Advertising and other promotional material will be presented to viewers in a manner and context that facilitates differentiation between it and the original material created by the institution operating the site.

1.2.2. HEALTH INFORMATION TECHNOLOGY INSTITUTE

In May 1998 the Health Information Technology Institute of Mitretek Systems convened the third Health Summit Working Group meeting. First held in 1996, the Working Group includes representatives of the general public, health-care providers, medical librarians, and Web site developers. Participants from the Federal sector include representatives from the Office of

Disease Prevention and Health Promotion in HHS, the Office of Alternative Medicine at NIH, the National Cancer Institute, and the Center for Public Health Practice in HHS.

The purpose of their conversations was to establish criteria for health information Web sites. As such, the participants focused on health information Web sites intended primarily for the general public. The product of these meetings was a policy paper describing evaluation criteria for health-related Web sites. These criteria are listed in order of importance and include:

- **Credibility**—includes the source, currency, relevance/utility, and editorial review process for the information.
- **Content**—must be accurate and complete, and an appropriate disclaimer provided.
- **Disclosure**—includes informing the user of the purpose of the site, as well as any profiling or collection of information associated with using the site.
- **Links**—evaluated according to selection, architecture, content, and back linkages.
- **Design**—encompasses accessibility, logical organization (navigability), and internal search capability.
- **Interactivity**—includes feedback mechanisms and means for exchange of information among users.
- **Caveats**—clarification of whether site function is to market products and services or is a primary information content provider.

The panel identified the source of the information as the most important subcriterion, and emphasized that the name and/or logo of the institute or organization responsible for the information should be prominently displayed. Other important subcriteria regarding credibility include the qualifications and/or credentials of the author(s) and the currency of the data (i.e., the effective date as well as the date it was posted to the site).

With respect to content, it must "be accurate and complete; an appropriate disclaimer should also be provided." An appropriate disclaimer includes providing information on the source data, the framework of the study, the "limitations, purpose, scope, authority, and currency of the information" and disclosure of all pertinent facts, including a statement of what is not known. Links were identified as "especially critical to the quality of an Internet site" and four subcriteria were described: selection, architecture, content, and back linkages. Linked sites should be selected by an appropriately qualified individual, and should be appropriate to the home site's target audience. Links should be clearly labeled and easy to identify. The content of linked sites should be "be accurate, current, credible, and relevant" as it directly reflects on the credibility of the parent site. Links to the home site from other Web sites (back links) should be monitored.

The Web site itself should be usable, accessible to disabled users, and ideally would offer an internal search engine that returns relevant results. It should also provide mechanisms for users to interact with staff, who should provide feedback and corrections and answer questions.

1.2.3. SIX SENSES

The Six Senses rating program was developed by Agency.com to provide a consistent set of criteria for evaluating medical and healthcare Web sites. Sites demonstrating "exceptional design and content" are presented with the Six Senses Seal Of Approval. While it is no longer active, the Six Senses program evaluated healthcare and medical Web sites based on six different criteria:

- **Content**—the depth, quality, and medical accuracy of information offered by a site.
- **Aesthetics**—the "eye pleasing" nature of a site, which reflects knowledge of the specific medical audiences to be addressed. This is most typically determined by layout, incorporation of graphical elements (i.e., buttons, toolbars, image maps), and use of color.
- **Interactivity**—the extent to which a site allows a user, professional or layperson, physician or patient, to intuitively navigate and explore a site, and effectively engages the user in an interactive experience.
- **Innovation**—the effective use of new technologies (RealAudio, VRML etc.), or the innovative use of older technologies (online forms, forums, etc.). Examples include online respiratory sounds and "fly-through" circulatory paths.
- **Freshness**—the incorporation and promotion of new healthcare and medical content. Sites that publish new content regularly (at least bi-weekly), but do not indicate this freshness, may score low in this category.
- **Character**—the measure of how successfully a site creates a strong, unique, and consistent "personality." Sites that dramatically change look & feel or shift editorial voice from technical medical language to layperson's terms generally score low in this category.

1.2.4. UNIVERSITY OF CONNECTICUT HEALTH CENTER

The University of Connecticut Health Center offers a series of criteria for assessing Web sites with consumer health information. The five points to consider include:

- **Content and scope of the site—**intended audience; purpose of the site; bias in the information; uniqueness.
- **Authority—**responsible entity or individual; credentials; medical expertise; information that allows communication with Web site author; quality of external links.
- **Currency—**regular updates and revisions; dates displayed and meaning of dates clear; currency of external links.
- **Ease of use—**logical menus; search capability; balance of internal and external links; navigation.
- **Appearance—**visual appeal; judicious use of graphics and color.

1.2.5. EMORY UNIVERSITY SCHOOL OF PUBLIC HEALTH WEB SITE EVALUATION FORM

Leslie Teach (let3@cdc.gov) has developed an evaluation instrument for health educators and clinicians to use to evaluate the appropriateness of Web sites for their clientele for further health education. The detailed form is available at http://www.sph.emory.edu/WELLNESS/instrument.html and collects basic information such as the subject of site, URL, intended audience, and objective. In the remaining sections of the data collection instrument, the respondent is asked to agree or disagree with a series of questions grouped by:

- **Content**—extent of coverage; evidence of bias; presence of a clearly stated purpose.
- **Accuracy**—sources are documented; use of HON code principles.
- **Author**—institution or organizational sponsorship identified; author/editor credentials; contact information.
- **Currency**—date clearly posted, including revision date.
- **Audience**—type of audience is evident; reading level, technical terms, and level of detail appropriate for the audience.
- **Navigation**—use of search engine; nature and use of internal links; site organization; links to software that must be downloaded.
- **External Links**—links that are relevant, operable, and current; links that are appropriate for the audience and link to reliable information as well as organizations that should be represented.
- **Structure**—use of educational graphics; a text only option that does not diminish the usefulness of the site; options for disabled users.

The instrument contains scoring instructions and information for interpreting results, as well as a glossary of terms used in the instrument.

1.3. WEB SITE REVIEWS

1.3.1. BUREAU OF LABOR AND STATISTICS (BLS)

From October 1996 to June 1997 Carol Hert (Syracuse University) and Gary Marchionini (University of Maryland) evaluated the BLS Web site, CPS Web site (co-sponsored by BLS and the Bureau of the Census), and the FedStats Web site (sponsored by the Interagency Council on Statistical Policy). The objectives of the study were to "determine who uses these services, what

types of tasks they bring to the sites, what strategies they use for finding statistical information, and to make recommendations for design improvements."

The BLS study used a constellation of evaluation methodologies to address different aspects of the Web sites from both internal (developer) and external (user) stakeholder perspectives. The research was divided into two phases: an investigative phase and an analysis of user activities. During the investigative phase, Hert and Marchionini sought to clarify the objectives of the site and understand the organizational perspective of the site's history and development processes. They used five data gathering methods: literature and Web site reviews, expert critiques, site mapping, document analysis, and interviews. During the user activities phase, the investigators focused on collecting data specifically related to how users accessed the site, including online interviews and focus groups, content analysis of email requests, impressionistic analysis of online comments, usability tests, and transaction log analyses.

They made specific recommendations regarding the three BLS sites, as well general comments that would be applicable to any Federal Web effort. Some of the more relevant findings are quoted below:

- There should be regular reviews of the state of the site using a suite of methods chosen from those applied in this project, extended and augmented appropriately for the different Web sites.
- Web sites should provide clear statements of what is and what is not available at the site.
- Web sites tend to be organized by agency structure rather than user needs. As we learn more about users and their needs, the sites can be reorganized to be more citizen-centered rather than agency-centered.
- Given the broad range of users that already use the sites and the likely broadening of user types as network access becomes more ubiquitous, it is important that agency sites begin to develop specialized views or interfaces for different information problems. This is related to the larger interface challenge for universal access and requires that designers adopt development approaches that support collaborative interactions on both the system and user sides.
- Interviews with BLS and Census staff showed consensus that not many casual Web surfers were using the data but the transaction log analysis suggests that many people do visit the BLS Web site casually and briefly. A policy issue agencies must decide is how much effort will be devoted to serving these potential users.
- Web sites are public interfaces for organizations. As such, they manifest the characteristics and culture of agencies. These information sources must be continually monitored and maintained as increasing numbers of new users take advantage of them and as the NII/GII continues to evolve.
- Web sites should develop archives of system states and apply records management practices to assessing and preserving those archives. Agencies should develop and publicize explicit collection development policies that specify what gets included in a Web site.
- All agencies should adopt procedures to do systematic evaluation and view strategic planning as ongoing change management rather than top-down planning.

1.3.2. DEPARTMENT OF EDUCATION

Carol Hert, Charles McClure, and others at the School of Information Studies at Syracuse University undertook an evaluation of several of the Department of Education's Web sites. The objectives of the study were to:

- Identify factors that affect the overall success and usability of selected Departmental Web sites.
- Examine the processes by which selected Web sites are managed and coordinated across the Department.
- Review the ease with which selected Departmental Web sites could be navigated and the ease with which users could locate and obtain information and services from those Web sites.
- Determine the degree to which the Department has developed an adequate policy system for operating the Web sites and the degree to which these policies recognize government-wide policy broadly related to Web site management and development.
- Provide example evaluation techniques and methods that the Department could use/modify for future assessment efforts.

In designing the study to meet these objectives they used four distinct assessment approaches:

- **Management assessment** identified the agency's internal structures and processes for Web site development and management.
- **Policy analysis** assessed the existence of and compliance with agency's IT policies, as well as how the agency's policies meet Federal standards and guidelines.
- **Log and transaction analysis** evaluated server logs to develop characteristics of Web site usage.
- **Usability testing** assessed the Web site's usefulness by watching representative users' attempts to complete specific tasks on the site.

Across these four approaches eight data collection techniques were used: focus groups, individual/group interviews, examination of Departmental documents, analysis of Web server logs and reconstructions of searches, user reviews of Web sites, user surveys and group discussions, policy instrument(s) comparison and analysis, and a Departmental staff survey.

There were several findings of this study that could potentially be applicable to any Federal Web effort:

- **Purpose of the Web site**: different stakeholders hold different perceptions of the purpose of the Web site. The Web site cannot successfully fulfill all these purposes simultaneously.
- **Web site management staffing**: There are insufficient personnel devoted to the Web site content creation, management, training, and evaluation. Participants, almost uniformly, expressed frustration about the number of activities for which they and others are responsible.

- **Strategic planning for the Web site**: The Department has an excellent long term vision of how it wishes to leverage Internet technology in support of its goals. Many staff report, however, that there it little time during their work weeks in which to think creatively or strategically. This lack (see staffing above) may impact the Department's ability to continue to grow the Internet site.

1.3.3. THE MEGASITE PROJECT

The Megasite Project: A Metasite Comparing Health Information Megasites & Search Engines was developed by staff and students at the University of Michigan, Northwestern University, and Pennsylvania State University. Its goal was to identify "the most useful sites for assisting with health sciences reference." This study had four segments: a literature review, collection of site recommendations, evaluation of selected sites, and a survey of site Webmasters. The site evaluation criteria were derived from numerous sources, including the Yale C/AIM Style Manual and various accessibility guidelines and included criteria on the relevance and usefulness of search engine results.

From an initial pool of over 50 federal, nonprofit, and commercial health sites the reviewers selected 25 to evaluate. Of these 25, three were selected as "Best Overall" in the categories of Design and Content. The only site to be selected for both categories was a Federal site, healthfinder <http://www.healthfinder.gov>, despite the fact the healthfinder search engine scored a "1" on a scale of 1 to 5.

1.3.4. SIX SENSES—FDA

Of the six Federal healthcare and medical sites reviewed by Six Senses, the only one to receive the "Six Senses Seal of Approval" was the Food and Drug Administration (FDA) with a 27 out of 36 possible points. All of the reviews were completed in 1996, so it is not clear how much has changed with the other sites in the intervening three years, but it is clear from the comments that the current interface of the FDA site is quite similar to the one reviewed.

The FDA site scored a 27.0 out of a possible 36.0, with points in the following categories: Content = 5.33; Aesthetics = 4.67; Interactivity = 4.33; Innovation = 3.67; Freshness = 4.67; Character = 4.33. The review summary states:

> A standard setter for government sites, FDA incorporates deep content with clean design in a spiffy site. The online journals, press releases, and consumer information are some of the highlights. The graphics are classy and the organization proves strong. The mission of the site is confusing and our panel hopes to see more fresh material and modern Web technologies.

By contrast, the Children with Diabetes site <http://www.childrenwithdiabetes.com/>, the highest ranking given to any of the sites reviewed, scored a 33.7 of 36 possible points.

1.3.5. MEDLINE*PLUS* INTERFACE

Keith Cogdill of the University of Maryland Human-Computer Interaction Laboratory conducted a formative evaluation of the National Library of Medicine's MEDLINE*plus* <http://www.nlm.nih.gov/medlineplus>, which provides access to sources of authoritative health information on the World Wide Web. The focus of the two-phase evaluation was the MEDLINE*plus* interface. In the first phase three members of an expert review panel were assembled to conduct a heuristic evaluation. The second phase consisted of usability testing with nine participants recruited from the waiting areas of primary care practices. Findings and recommendations of the study, which serve as a baseline for assessing future improvements, were grouped into six themes:

- **Organization:** resource orientation; arrangement of health topics list; depth of navigation menu; Homepage resource categories; library selection criteria; organization of links to libraries; health topics resource categories; drug information; dual columns.
- **Browsing efficiency:** health topics category formatting; undifferentiated text; undifferentiated MEDLINE links; current location in navigation menu; text density; accessibility of navigation menu;
- **Search feature:** direction to search feature; search domain; search interface consistency; retrieval algorithm; search feedback; differentiating query terms in retrieved pages; fuzzy search algorithm; hot topics; position of MEDLINE*plus* search feature; restricting searches to a health topic.
- **Boundary:** boundary page formatting; boundary page navigation.
- **MEDLINE:** technical nature of MEDLINE records; MEDLINE page.
- **Universal usability:** Foreign language resources; compliance with accessibility guidelines.

A seventh category of findings and recommendations encompasses issues pertaining to the content of MEDLINE*plus* and minor suggestions related to the interface.

Members of the heuristic review panel independently assessed the MEDLINE*plus* interface using a standard set of heuristics:

- **Internal consistency.** The user should not have to speculate whether different phrases or actions carry the same meaning.
- **Simple dialogue.** The dialogue with the user should not include information that is irrelevant, unnecessary or rarely needed. The dialogue should be presented with terms familiar to the user and not be system-oriented.
- **Shortcuts.** The interface should accommodate both novice and experienced users.
- **Minimizing the user's memory load.** The interface should not require the user to remember information from one part of the dialogue to another.
- **Preventing errors.** The design of the interface should prevent errors from occurring.
- **Feedback.** The system should keep the user informed about what is taking place.

- **Internal locus of control.** Users who choose system functions by mistake should have an "emergency exit" that allows them to leave the unwanted state without having to engage in an extended dialogue with the system.

Usability tests were videotaped, and involved a standard set of five information-finding tasks. Each participant was allowed to freely explore MEDLINE*plus* for up to ten minutes before testing began. Criteria for successfully completing each task were developed in advance of the testing. Each test session was followed by a debriefing and post-test questionnaire to elicit feedback on specific problems, overall impression of the site, and "best" and "worst" features of MEDLINE*plus*.

1.4. SOURCES

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<http://hitiWeb.mitretek.org/docs/criteria.html>

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The Six Senses Review, a Healthcare & Medical Web Site Review Program. Public Health & Government catgeory. <http://www.sixsenses.com/CATEGORIES/public.html>

APPENDIX A-2. SAMPLE SURVEY OF WEBMASTERS

INSTRUCTIONS

The [institute or agency name] is conducting a survey of Webmasters and staff to gather information about the [institute or agency name] Web technology services. The survey is designed to gain a better understanding of the performance of Web technology and the Web development process. Your participation in this survey is voluntary. We hope you will take a few minutes to complete it because your opinions and experiences will help formulate decisions about [institute or agency name] Web technology services.

If you have any questions about the survey, please email _____.

When you have completed the survey, please click the submit button at the end to return the survey.

Thank you for your participation in this very important survey!

PART I: CONTACT INFORMATION

It is important that we have accurate contact information for you. This information will not be distributed to anyone, but will be used only to contact you if we need to follow up for clarification.

1. Name

2. Email Address

3. Work phone

4. What is your organizational affiliation within [institute or agency name]? Are you:

   - O An [institute or agency name] employee
     please specify your branch, division, and/or office

   - O A contractor with [institute or agency name]
     please specify your company's name

   - O other affiliation
     please specify

PART II: WEB SERVER HARDWARE AND OPERATING SYSTEM

Are you responsible for Web server hardware and/or operating system software?

- ○ yes
- ○ no

If no, survey skips to next part

PART II: WEB SERVER HARDWARE AND OPERATING SYSTEM

Please list the address(es) of the server(s) for which you are responsible:

Which of these servers **occupies the largest portion of your time?**
Please list the address of this server:

Please answer the following questions about the one server that **you listed immediately above** as occupying the largest portion of your time:

1. What is the hardware architecture of the server?
   - O Intel/AMD/Cyrix PC-compatible
   - O Mac
   - O Sun
   - O SGI
   - O non-PC-compatible IBM
   - O non-PC-compatible HP
   - O non-PC-compatible Digital/Compaq
   - O other (please specify:)
   - O don't know

2. What is the operating system that runs the server?
   - O Windows NT 3.51
   - O Windows NT 4.0
   - O Windows 2000
   - O Windows 95/98
   - O MacOs
   - O Linux
   - O Solaris
   - O Irix
   - O other (please specify:)
   - O don't know

3. How much RAM is installed on the server?
   - O under 32Mb
   - O 32-64Mb
   - O 64-128Mb
   - O 128-256Mb
   - O 256-512Mb
   - O 512-1024Mb
   - O over 1024Mb
   - 1. don't know

4. How much disk space is installed on the server?
   - O under 2Gb
   - O 2-4Gb
   - O 4-6Gb
   - O 6-10Gb
   - O 10-16Gb
   - O 16-26Gb
   - O 26-42Gb
   - O 42-68Gb
   - O more than 68Gb
   - O don't know

5. Does the server use Redundant Array of Inexpensive Devices (RAID) drives?
   - O raid level 0 *(striping)*
   - O raid level 1 *(mirroring)*
   - O raid level 2
   - O raid level 3
   - O raid level 4
   - O raid level 5
   - O does not use RAID
   - 2. don't know

6. How often is the server backed up?
   - O more frequently than daily
   - O daily
   - O weekly
   - O several times a month
   - O monthly
   - O less often than monthly
   - O never
   - 3. don't know

7. If backups are made, what is the <u>primary</u> backup medium?
   - O Local disk
   - O Remote disk
   - O Removable disk [including Zip and Jaz]
   - O CD-R
   - O CD-RW
   - O other optical
   - O QIC tape [not including Travan]
   - O Travan tape
   - O DAT
   - O DLT
   - O other tape
   - O other (please specify:)

     [ ]
   - O don't know

8. For the server that occupies the largest portion of your time, how many **hours per month** do you spend supporting its hardware and operating system?

   [ ] hours per month

9. How many staff members, either full-time or part-time, support the hardware and operating system for this server?

   [ ] Staff members

   O don't know

10. Approximately how many **hours per month** do all of these staff members spend supporting the hardware and operating system for this server?

    [ ] hours per month for all staff members

    O don't know

PART III: WEB SERVER SOFTWARE

Are you responsible for Web server software?

- ○ yes
- ○ no

If no, survey skips to next part

PART III: WEB SERVER SOFTWARE

For the Web server software you're responsible for, please list the address(es) of the server(s):

Which of these Web servers **occupies the largest portion of your time?**
Please list the address of this server:

Please answer the following questions about the one Web server that **you listed immediately above** as occupying the largest portion of your time:

1. What Web server software is used?
   - ○ Apache (or derivatives)
   - ○ Microsoft IIS (any version)
   - ○ Netscape Fast Track or Enterprise
   - ○ O'Reilly Web Site Pro
   - ○ WebStar
   - ○ other (please specify:)
   - ○ don't know

2. What other servers are installed? *Select all that apply.*
   - ☐ Real Networks streaming media server
   - ☐ Chat server
   - ☐ no other servers are installed
   - ☐ other (please specify:)
   - ☐ don't know

3. What application environments are supported on this Web server? *Select all that apply.*
   - ☐ CGI
   - ☐ Java
   - ☐ ColdFusion
   - ☐ StoryServer
   - ☐ other (please specify:)
   - ☐ don't know

4. Does this Web server support secure data transmission (via HTTPS, IPSEC, or other secure protocols)?
   - ○ yes
   - ○ no
   - ○ don't know

5. For the server that occupies the largest portion of your time, how many **hours per month** do you spend supporting its Web server software?

   hours per month

6. How many staff members, full-time or part-time, support this Web server software?

   [ ] Staff members

   O don't know

7. Approximately how many hours per month do these staff members spend supporting this Web server software?

   [ ] hours per month for all staff members

   O don't know

PART IV: CONNECTIVITY

Are you responsible for networking or connectivity to the Web server?

- ○ yes
- ○ no

If no, survey skips to next part

PART IV: CONNECTIVITY

Please list the address(es) of the server(s) for which you are responsible:

Which of these servers **occupies the largest portion of your time?**
Please list the address of this server:

Please answer the following questions about the one server that **you listed immediately above** as occupying the largest portion of your time:

1. How is the server connected to the LAN?
   - O Ethernet
   - O Fast Ethernet
   - O Gigabit Ethernet
   - O Token-Ring
   - O other (please specify:)
   - O no LAN
   - O don't know

2. How is the server (or the entire LAN) connected to the Internet?
   - O dial-up
   - O T-1
   - O T-3
   - O other

   please specify method and speed
   For example: Frame Relay, 256Kbp:
   - O don't know

3. Do any firewalls protect the server (or the entire LAN)?
   - O yes

     please specify type or vendor:
   - O no
   - O don't know

PART V: STATIC CONTENT

Are you responsible for publishing static Web content (such as "pure" HTML pages)?

- ○ yes
- ○ no

If no, survey skips to next part

PART V: STATIC CONTENT

Please provide URLs that lead to the Web site(s) you are responsible for developing or programming static content.

Which of these Web sites for which you develop or program static content **occupies the largest portion of your time?**
Please list the URL of this site:

Please answer the following questions about the one Web site for which you develop or program static content that **you listed immediately above** as occupying the largest portion of your time:

1. Who is primarily responsible for determining what content should be added to (or deleted from) this Web site?

   Name

   Title

   Email address/ phone number

   O don't know

2. Who is primarily responsible for providing this content?

   Name

   Title

   Email address/ phone number

   O don't know

3. For the Web site that occupies the largest portion of your time, how many **hours per month** do you spend working on publishing this content?

   hours per month

4. How many staff members, full-time or part-time, presently work on publishing the content for this Web site?

   Staff members

   O don't know

5. Approximately how many hours per month do these staff members spend working on publishing the content for this Web site?

   hours per month for all staff members

   O don't know

6. What tools are used to publish the static content on this Web site? *Select all that apply.*

   ☐ Notepad/text editor
   ☐ FrontPage
   ☐ Dreamweaver
   ☐ HomeSite
   ☐ CodeWright
   ☐ NetObjects Fusion
   ☐ PageMill
   ☐ BBEdit
   ☐ HoTMetaL Pro
   ☐ other HTML authoring packages (please specify:)

   ☐ don't know

7. What packages of "off-the-shelf" content are used on this Web site? *Select all that apply.*

   ☐ Clip art libraries
   ☐ FrontPage extensions
   ☐ other extension packages
   ☐ none
   ☐ other (please specify:)

   ☐ don't know

8. Do you validate the HTML you produce for this Web site?

   ○ yes
   ○ no
   ○ don't know

If no, survey skips to question 10

9. Which standards do you use to validate the HTML that you develop for this Web site? *Select all that apply.*

   ☐ HTML 3.2
   ☐ HTML 4.0 Transitional [Loose]
   ☐ HTML 4.0 [Strict]
   ☐ other (please specify:)

   ☐ HTML is not validated
   ☐ don't know

10. Do you validate or test this Web site to ensure that it is accessible to all users?

    ○ yes
    ○ no
    ○ don't know

If no, survey skips to question 12

11. What tools do you use to validate or test the accessibility of this Web site? *Select all that apply.*

    ☐ Bobby automated validation tool
    ☐ WWW HTML Accessibility Tool (WHAT)
    ☐ Test site using text-based browser (such as Lynx)
    ☐ Test site using assistive technology (screen reader, etc.)
    ☐ other (please specify:)

    ☐ Site is not validated or tested for accessibility issues
    ☐ don't know

12. What standards for accessible Web design do you follow when developing this Web site? *Select all that apply.*

- ☐ W3C/WAI Web Content Accessibility Guidelines 1.0 (5 May 1999)
- ☐ Earlier version of W3C/WAI recommendation
- ☐ Trace Wisconsin accessibility guidelines
- ☐ other (please specify:)

  [ ]
- ☐ Do not use any specific accessibility standards
- ☐ don't know

13. What is the **minimum** browser necessary for this Web site to display properly?

- ○ standard HTML 3.2 only
- ○ Lynx
- ○ Netscape Navigator 2+
- ○ Netscape Navigator 3+
- ○ Internet Explorer 3+
- ○ Netscape Navigator 4+
- ○ Internet Explorer 4+
- ○ Internet Explorer 5+
- ○ other (please specify:)

  [ ]
- ○ don't know

14. What browsers are recommended for optimum viewing of this Web site? *Select all that apply.*

- ☐ Lynx
- ☐ Netscape Navigator 2+
- ☐ Netscape Navigator 3+
- ☐ Netscape Navigator 4+
- ☐ Internet Explorer 3+
- ☐ Internet Explorer 4+
- ☐ Internet Explorer 5+
- ☐ don't know

15. Do you add META tags to the HTML pages of this Web site?

- ○ yes
- ○ no
- ○ don't know

If no, survey skips to question 18

16. For what purposes do you add META tags to the HTML pages of this Web site? *Select all that apply.*

- ☐ Authoring tool adds them automatically
- ☐ Standard site development policy
- ☐ Site search engine uses META tags to display search results
- ☐ To improve ranking in Web search engines
- ☐ To refresh or redirect a page
- ☐ To set a session or permanent cookie
- ☐ other (please specify:)

  [ ]
- ☐ don't know

17. What types of META tags do you add to the HTML pages of this Web site? *Select all that apply.*

- ☐ keyword
- ☐ description
- ☐ expires
- ☐ generator
- ☐ set-cookie
- ☐ other (please specify:)

  [ ]
- ☐ don't know

18. Does this Web site use style sheets?

- ○ yes
- ○ no
- ○ don't know

19. How much of the information provided by this Web site was originally developed for another medium (such as a printed brochure converted to Adobe Acrobat)?

- ○ none
- ○ Less than 25%
- ○ 25 – 50%
- ○ 50 – 75%
- ○ More than 75%

PART VI: DYNAMIC CONTENT

Are you responsible for publishing dynamic Web content (such as multimedia, CGI-scripted, or database- or program-generated pages)?

- ○ yes
- ○ no

If no, survey skips to end

PART VI: DYNAMIC CONTENT

Please provide URLs that lead to the dynamic Web content you publish.

Which of these Web sites for which you develop or publish dynamic content **occupies the largest portion of your time?**
Please list the URL of this site:

Please answer the following questions about the one Web site that **you listed immediately above** as occupying the largest portion of your time:

1. Who is primarily responsible for determining what content should be added to (or deleted from) this Web site?

   Name

   Title

   Email address/ phone number

   O don't know

2. Who is primarily responsible for providing this content?

   Name

   Title

   Email address/ phone number

   O don't know

3. For the Web site that occupies the largest portion of your time, how many **hours per month** do you spend working on publishing this content?

   hours per month

4. How many staff members, full-time or part-time publish content for this Web site?

   FTEs

   O don't know

5. Approximately how many hours per month do these staff members spend working on publishing the content for this Web site?

   hours per month for all staff members

   O don't know

- Do you validate or test this Web site to ensure that it is accessible to all users?
  - ○ yes
  - ○ no
  - ○ don't know

If no, survey skips to question 8

7. What tools do you use to validate or test the accessibility of this Web site? *Select all that apply.*
   - ☐ Bobby automated validation tool
   - ☐ WWW HTML Accessibility Tool (WHAT)
   - ☐ Test site using text-based browser (such as Lynx)
   - ☐ Test site using assistive technology (screen reader, etc.)
   - ☐ other (please specify:)
   - ☐ Site is not validated or tested for accessibility issues
   - ☐ don't know

8. What standards for accessible Web design do you follow when designing or implementing this Web site? *Select all that apply.*
   - ☐ W3C/WAI Web Content Accessibility Guidelines 1.0 (5 May 1999)
   - ☐ Earlier version of W3C/WAI recommendation
   - ☐ Trace Wisconsin accessibility guidelines
   - ☐ other (please specify:)
   - ☐ Do not use any specific accessibility standards
   - ☐ don't know

9. Which of the following technologies does this Web site use? *Select all that apply.*
   - ☐ SSIs
   - ☐ DHTML
   - ☐ XML
   - ☐ VRML
   - ☐ other (please specify:)
   - ☐ none of these technologies
   - ☐ don't know

10. What types of dynamic server-side applications are used in this Web site? *Select all that apply.*
    - ☐ ASP
    - ☐ ColdFusion
    - ☐ JavaScript
    - ☐ VBScript
    - ☐ CGI
    - ☐ Java Servlets
    - ☐ other (please specify:)
    - ☐ none of these applications
    - ☐ don't know

11. If CGI is used in this Web site, in what languages are CGI programs written? *Select all that apply*.
    - ☐ Perl
    - ☐ C
    - ☐ C++
    - ☐ Java
    - ☐ Visual Basic
    - ☐ other (please specify:)
    - ☐ CGI language is not used
    - ☐ don't know

12. Who is primarily responsible for providing scripting or programming support for this content?

Name	
Title	
Email address/ phone number	

○ don't know

13. What types of multimedia content are used in this Web site? *Select all that apply.*

- ☐ Adobe Acrobat PDF
- ☐ Flash/Shockwave
- ☐ QuickTime
- ☐ Real Media (streaming video)
- ☐ Real Media (streaming audio)
- ☐ .WAV, .AIFF, or other non-streaming audio formats
- ☐ other (please specify:)

  [ ]
- ☐ none
- ☐ don't know

14. What tools are used to create this dynamic content? *Select all that apply.*

- ☐ Adobe Acrobat Exchange
- ☐ Macromedia Flash
- ☐ Macromedia Director
- ☐ Macromedia Authorware
- ☐ QuickTime
- ☐ Real Media Encoder
- ☐ Sound editing utilities
- ☐ other (please specify:)

  [ ]
- ☐ none
- ☐ don't know

- Do you add META tags to the (static or dynamically-generated) HTML pages of this Web site?
  - ○ yes
  - ○ no
  - ○ don't know

If no, survey skips to question 18

- For what purposes do you add META tags to the HTML pages of this Web site? *Select all that apply.*
  - ☐ Authoring tool adds them automatically
  - ☐ Standard site development policy
  - ☐ Site search engine uses META tags to display search results
  - ☐ To improve ranking in Web search engines
  - ☐ To refresh or redirect a page
  - ☐ To set a session or permanent cookie
  - ☐ other (please specify:)

    [ ]
  - ☐ don't know

- What types of META tags do you add to the HTML pages of this Web site? *Select all that apply.*
  - ☐ keyword
  - ☐ description
  - ☐ expires
  - ☐ generator
  - ☐ set-cookie
  - ☐ other (please specify:)

    [ ]
  - ☐ don't know

- What browsers are recommended for optimum viewing of this Web site? *Select all that apply.*
  - ☐ Lynx
  - ☐ Netscape Navigator 2+
  - ☐ Netscape Navigator 3+
  - ☐ Netscape Navigator 4+
  - ☐ Internet Explorer 3+
  - ☐ Internet Explorer 4+
  - ☐ Internet Explorer 5+
  - ☐ other (please specify:)

    [ ]
  - ☐ none
  - ☐ don't know

- What browser plug-ins are recommended for optimum viewing of this Web site? *Select all that apply.*
  - ☐ Macromedia Flash
  - ☐ Adobe Acrobat Reader
  - ☐ other (please specify:)

    [ ]
  - ☐ none
  - ☐ don't know

PART VII: CONCLUSION

This concludes our survey. We appreciate your participation.

If you have comments about this survey, including matters related to its content, structure, or intent, please enter them in the box below.

If you know any other staff who you think should complete this survey, please provide their names, titles, email addresses and/or phone numbers.

Name	
Title	
Email address/ phone number	

Name	
Title	
Email address/ phone number	

Name	
Title	
Email address/ phone number	

PLEASE CLICK THE SUBMIT BUTTON TO RETURN YOUR SURVEY TO US. THANK YOU!

Submit

APPENDIX A-3. HEURISTIC GUIDELINES FOR EXPERT CRITIQUE OF A WEB SITE

Heuristic usability evaluations (also called "expert reviews" or "usability audits") are an efficient method of assessing a Web site for usability. This methodology provides for one or more usability professionals who are familiar with industry best practices in user interface design to evaluate an application based on recognized "rules of thumb." The objective is to identify possible difficulties that users of the site may have with the current user interface and to recommend design improvements.

HEURISTIC EVALUATIONS, COMPLIANCE REVIEWS, AND VERIFICATION/VALIDATION EVALUATIONS

It is important to distinguish heuristic evaluations of a Web site user interface from other types of design reviews. Heuristic evaluations focus on established design rules of thumb. Typically, the emphasis is not on comprehensively examining the functionality of the site. More often the review is conducted in the context of typical user tasks or "use cases," with an emphasis on providing feedback to the site's developers on the extent to which the "look and feel" seems consistent with industry best practices and is likely to be compatible with the intended users' needs and preferences.

Heuristic usability reviews can be contrasted with evaluations that are conducted for the purposes of assuring compliance with a chosen design style or for verification and validation of site functionality. Development teams should formulate a user interface style guide for a particular Web site to ensure the implementation of a consistent look and feel. Style compliance reviews focus on checking for such consistency, usually with the goal of systematically evaluating the entire site. Verification and validation reviews of Web sites focus on whether the interface works as intended. The validation review may examine the extent to which the interface meets users' needs and may utilize the same types of "use cases" that would be used for a heuristic evaluation. However, verification and validation reviews typically focus on site functionality, whereas heuristic evaluations focus on look and feel in the context of user tasks.

PERSONNEL

`How Many Reviewers? Heuristic evaluations are typically conducted by one or a small number of reviewers. Studies that have examined the number of usability problems identified in a user interface as a function of the number of reviewers, e.g., Nielsen, (1994), have shown the advantages of involving more than one reviewer. It is difficult for any one reviewer, no matter how knowledgeable, to anticipate the full range of usability issues that a system's users may encounter. On the other hand, there are diminishing returns as additional reviewers are added. Typically, the most egregious problems are identified by most or all reviewers. Having three to five reviewers examine an interface is advisable, but meaningful reviews can be accomplished with fewer.

Qualifications of Reviewers? Because heuristic evaluations focus on the user interface design and likely user concerns, it is best if they are conducted by reviewers who are knowledgeable about industry best practices and current thinking in designing for ease of use. Design rules of thumb are subject to some interpretation, so this places a premium on the heuristic reviewer's experience and knowledge of best practices. Having completed such evaluations productively in the past is probably a better predictor of competence than any particular academic credentials. There are two professional certification programs for human factors professionals, but the field of human factors and ergonomics is broad enough that an individual having these credentials can not be guaranteed to possess current knowledge in computer-human interface technology and practices. There are many competent usability engineers who have not sought this certification. There is no particular academic discipline that "owns" usability or user interface design. Usability professionals often come to that specialty from backgrounds in experimental or cognitive psychology, industrial engineering, human factors engineering, or computer science. Heuristic evaluations are best accomplished by individuals other than those who created the interface that is under review. Prior domain knowledge about the content of the Web site is helpful, although not critical. It is useful for the reviewer to consider the business goals of the Web site, the nature of the competition, and the constraints under which the organization responsible for the Web site is operating. It is critical, however, that the reviewer examine the Web site from the perspective of a user who may not have prior domain knowledge about the Web site. Thus empathy is an important qualification for a heuristic reviewer.

TIME REQUIRED TO CONDUCT THE EVALUATION

Most heuristic reviews can be accomplished within days rather than hours or weeks. The time required for a heuristic evaluation of a Web site varies with the size of the site, its complexity, the purpose of the review, the nature of the usability issues that arise in the review, and the competence of the reviewers. The time required includes not only visual inspection of the site, but also understanding of the design objectives, the range of users that it is intended to accommodate, and typical user tasks (i.e., "use cases"). There is also time involved in documenting usability concerns and if required, formulating design change recommendations. The stage of development of the Web site is another consideration. A cursory review of an early stage prototype for the purpose of assuring the developers that they are on the right track can be done more quickly than a more comprehensive review of a fully developed site for the purpose of assuring consistency in the implementation of certain design approaches.

WHEN TO EVALUATE A DESIGN?

Conducting usability evaluations early and often throughout the development process greatly facilitates user-centered design. Because heuristic evaluations can often be conducted relatively quickly, they provide a cost-effective way in which to iteratively evaluate an interface design as it proceeds through development. Heuristic evaluations can be conducted on very early stage prototypes, including paper mockups, as well as later stage electronic prototypes, with or without all of the "back end" functionality implemented. Usability problems discovered early in the

design process can usually be fixed more cost effectively than if the same problems are discovered later.

DESIGN RULES OF THUMB

There are several conceptualizations of usability design heuristics and best practices that are widely used. These are not mutually exclusive and, in fact, cover many of the same aspects of user interface design. The most pervasive is a set of user interface design principles that were elucidated by Nielsen (1994), based on a principal components analysis of the usability problems found in a number of studies of various user interfaces. These design principles are summarized as follows:

- Visibility of system status. The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- Match between system and real world. The system should speak the users' language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
- User control and freedom. Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
- Consistency and standards. Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
- Error prevention. Even better than a good error message is a careful design which prevents a problem from occurring in the first place.
- Recognition rather than recall. Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
- Flexibility and efficiency of use. Accelerators—unseen by the novice user—may often speed up the interaction for the expert user to such an extent that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
- Aesthetic and minimalist design. Dialogues should not contain information that is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
- Help users recognize, diagnose, and recover from errors. Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
- Help and documentation. The ideal system can be used without documentation, but it may often be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

A second set of usability principles were proposed by Constantine (1994):

- Structure Principle. Organize the user interface purposefully, in meaningful and useful ways that put related things together and separate unrelated things based on clear, consistent models that are apparent and recognizable to others.

- Simplicity Principle. Make simple, common tasks simple to do, communicating simply in the user's own language and providing good shortcuts that are meaningfully related to longer procedures.
- Visibility Principle. Keep all needed options and materials for a given task visible without distracting the user with extraneous or redundant information.
- Feedback Principle. Keep users informed of actions or interpretations, changes of state or condition, and errors or exceptions using clear, concise, and unambiguous language familiar to users.
- Tolerance Principle. Be flexible and tolerant, reducing the cost of mistakes and misuse by allowing undoing and redoing while preventing errors wherever possible by tolerating varied inputs and sequences and by interpreting all reasonable actions reasonably.
- Reuse Principle. Reduce the need for users to rethink and remember by reusing internal and external components and behaviors, maintaining consistency with purpose rather than merely arbitrary consistency.

CONDUCTING THE EVALUATION

Planning for a heuristic evaluation involves acquainting the reviewers with the Web site or application, specifying usability objectives, identifying the characteristics of typical users, and delineating "use cases," i.e. typical task scenarios in which the site is used. The reviewer should take full advantage of any known usability problems. Information on problems that may have surfaced from help desk type inquiries, user email comments, or professional critiques by the media or industry reviewers should be incorporated into the preparation for the evaluation.

Characteristics of the Intended Users. The usability criteria against which a site is evaluated depends in part on the characteristics of its intended users. User characteristics that should be taken into account include education, domain knowledge, technological sophistication, computer literacy, and specific experience in using the Web. Also important are the types of computer platforms and Internet connectivity that users are likely to be utilizing to access the site. A Web site that is designed for scientists or medical personnel might be held to somewhat different standards than a site that is expected to be accessed by the public. While in many respects good design is good design, one might anticipate the use of certain terminology or information architecture if one can assume a particular level of user domain knowledge.

Typical Tasks. Because heuristic evaluation of a user interface is more user-centered than comprehensive, the review is usually best accomplished in the context of typical user tasks. A task analysis of the site's intended usage as well as identification of tasks that are the most frequently executed or are the most important to users will identify tasks that should be emphasized. The tasks that would be derived from such an exercise are likely to coincide with the major elements of the site's functionality. In formulating user tasks, one should consider the likely perspective of the typical user, including motivation for accessing the site, initial knowledge and assumptions, likely expectations and preferences, and their "mental model" of how the site should work. It may also be helpful to conceptualize the likely experience that the site offers to first-time users versus repeat visitors.

Examining the Site. After gathering background information on site objectives, user characteristics, and user tasks, the reviewer can proceed with a systematic examination of the site. If more than one reviewer is involved, each should work independently. The site should be accessed with computer platforms and Internet connectivity that are representative of a range of typical users. It is advisable for a reviewer to make two passes: the first to become acquainted with the overall flow of the application and the second to focus more specifically on individual elements of dialog or the look and feel (see e.g., Nielsen, 1994). Possible problems should be documented with reference to specific Web pages or on-screen design elements. It is also advisable to note the pervasiveness of each problem.

DOCUMENTING THE RESULTS

Specific statements of usability problems and design solution(s) are most helpful to developers. Usability problems noted in writing during the review can be grouped and content analyzed; observations made by different reviewers should be combined in order to determine the degree of consensus or to elucidate alternative positions. It is sometimes of interest to assign a level of severity to the usability problems revealed. One scheme (Nielsen, 1994) for assigning severity codes is to consider (1) the frequency with which users will encounter each problem (what proportion of users will encounter it and how often a given user will experience it in a single session), (2) the impact of the problem (the ease with which the user may overcome the problem), and (3) the persistence of the problem (the likelihood of encountering the problem in multiple sessions). Another scheme is to categorize severity in terms of problems that prevent task completion, those that hinder but do not prevent task completion, and those that present a nuisance or variance from what users might expect but do not significantly hinder task performance. Recognizing that it is easier to critique than to design, it is advisable for reviewers to provide design solutions, or to suggest alternatives, along with a delineation of the problems.

USABILITY CHECKLIST

The following checkpoints represent a list of items a human factors engineer or other usability professional might use to analyze a Web site. They are derived from Jakob Nielsen's "Ten Usability Heuristics[8]," his Alertbox[9] column, and *Designing Usability: The Practice of Simplicity*.

CHECKPOINT	*YES*	*NO*	*NA*
1. **Visibility of system status:** The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.			
1.1 Structure helps users navigate. Without structural links, pages are orphaned in cyberspace. Provide users with a path to higher levels of navigation and content.			

[8] Nielsen, Jakob. "Ten Usability Heuristics." http://www.useit.com/papers/heuristic/heuristic_list.html
[9] http://www.useit.com/alertbox/

1.2 Accommodate and support user-controlled navigation. Do not force users through set paths. Make alternate paths easy to follow, consistent, and logical.			
2. **Match between system and the real world:** The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.			
2.1 Avoid using technical, scientific or legal language. On main pages of the site, create content that can be understood by a general audience.			
2.2 When creating your site's navigation, do not simply copy your organization's structure. Create a navigation design and options that reflect user tasks on your site.			
3. **User control and freedom:** Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.			
3.1 Instead of cramming everything about a product or topic into a single page, use hypertext to structure the content space into a starting, overview page and several secondary pages that each focus on a specific topic. Help users avoid wasting time on subtopics that don't concern them.			
3.2 Don't disabled the Back button on a browser by opening a new window or using an immediate redirect. The Back button is the second-most used navigation feature (after following hypertext links). Users know that they can try anything on the Web and then click on the Back to return to familiar territory.			
3.3 People rarely read Web pages word by word; instead, they scan the page, picking out individual words and sentences. Use lists, headings, and other HTML formatting tools to help users find the information that suits their needs.			
3.4 Credibility is important for Web users. It is unclear who is behind information on the Web, and users need to know whether a page's content can be trusted. High-quality graphics, good writing, and use of outbound hypertext links can increase credibility.			
3.5 If your users have analog modems, warn them of the download size for any file over 50 kilobytes.			
4. **Consistency and standards:** Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.			

4.1 Do the same as everybody else. If most big Web sites do something in a certain way, then follow along. Users will expect things to work the same way on your site.			
4.2 Avoid using HTML that does not comply with standards[10] or causing the user's browser to engage in a nonstandard behavior.			
5. **Error prevention:** Even better than a good error message is a careful design which prevents a problem from occurring in the first place.			
5.1 Use link titles to provide users with a preview of where each link will take them, before they have clicked on it. Help them avoid waiting for unnecessary page downloads.			
5.2 Avoid linkrot by keeping pages up indefinitely once they have been put on the Web. Other sites may link to your page. Users may have bookmarked the page because they want to go directly to a relevant part of your site. Search engines are slow in updating their databases, so they too will lead users astray if you remove pages.			
5.3 Avoid using a new technology for one to two years after it is first introduced in non-beta version. If your users have not adopted the new technology, they will not be able to access content that uses that technology.			
6. **Recognition rather than recall:** Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.			
6.1 Provide search if the site has more than 100 pages.			
6.2 Write straightforward and simple headlines and page titles that clearly explain what the page is about and that will make sense when read out-of-context in a search engine results listing.			
6.3 Structure the page to facilitate scanning; for example, use grouping and subheadings to break content into smaller "chunks."			
6.4 Page titles, headlines, and subject lines needs to clear and succinct. You only get 40-60 characters to explain your content. Unless the title or subject makes it absolutely clear what the page or email is about, users will never open it.			
7. **Flexibility and efficiency of use:** Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.			

[10] See http://www.w3.org/MarkUp/ for more information on HTML standards.

8. **Aesthetic and minimalist design:** Dialogues should not contain information that is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.			
8.1 When designing for the Web, download speed must be the overriding criterion. To keep page sizes small, graphics should be kept to a minimum, and multimedia effects should be used only when they can add to a user's understanding of the information. Keep it simple.			
8.2 Split long pages of text into multiple pages, connected with hyperlinks. Each "chunk" of content should cover a specific topic. No more, no less.			
8.3 Avoid creating huge scrolling pages of text; as they move down the page, users will no longer be able to see navigation options.			
9. **Help users recognize, diagnose, and recover from errors :** Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.			
10. **Help and documentation:** Any Help or documentation should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.			
10.1 When writing documentation, provide multiple examples to help the user contextualize their problem.			
11. **Design for accessibility:** Our analysis of accessibility is based on the World Wide Web Consortium's (W3C) guidelines.			

REFERENCES

Constantine, L. L. (1994). Collaborative Usability Inspections for Software. Software Development '94 Proceedings, San Francisco: Miller Freeman.

Nielsen, J. (1994). Heuristic Evaluation. In J. Nielsen & R. L. Mack (Eds), Usability Inspection Methods, New York: John Wiley & Sons, Inc., pp. 25-62.

APPENDIX A-4. WEB SITE USABILITY TEST PLAN

Overview

This usability test plan describes the recommended approach for pilot testing a usability assessment that addressing the following issues:

- Efficiency and effectiveness of use
- Time to accomplish tasks
- Nature and incidence of errors
- User satisfaction with the Web site from the perspective of different user types

Participant Selection and Recruitment

A total of nine participants will be recruited from a UserWorks[11] database of participants and from personal contacts. Three will be selected to meet the criteria of each of three predefined user categories.

Facilities

Most test sessions will be conducted in UserWorks' usability suites in Silver Spring, MD. The test participants will use a Pentium-200 MHz, Windows 95 workstation with dial-up Internet access via a 56 Kbs modem. Actual connection speeds will vary from 21 Kbs to 36 Kbs. The participants will be given the choice of two browsers—Internet Explorer 5.0 or Netscape Communicator 4.5. The room will also contain a video camera, a scan converter to capture the user's computer screen in real-time and convert it to video, and a microphone to capture the voices of the test participant and the test administrator. The test administrator will sit beside and behind the participant to observe and note his or her actions. If necessary, the accessibility challenged participants will be tested at their work or home, using UserWorks' portable usability lab, Lab-in-a-Bag.

A picture-in-a-picture image, consisting of a video camera view of the participant inserted in the scan converted view of his or her screen, will be recorded on Hi-8 mm videotape. The participant's comments will be recorded, as will the interactions between the participant and the test administrator.

Test Procedures

Set-Up

Participants will be greeted by the UserWorks test administrator, given a quick tour of the test facility, and brought to the test station where they will be briefed on the nature of the test. Prior

[11] UserWorks, Inc., a small business located at 1738 Elton Road, Suite 138, Silver Spring, MD, was a subcontractor to QRC on this task.

to the test, participants will be asked to complete a short demographics questionnaire and a consent form to be videotaped.

Test Administration

Each test participant will be involved in a single test session that will last approximately 90 minutes, run one-on-one with a test administrator. The administrator will direct participants through a prepared script. The administrator will allow participants time to accomplish a series of tasks as described in the guide with a minimum of cues and suggestions offered only if needed. When intervening on such occasions, the test administrator will ask leading questions in an attempt to discern the underlying causes of any difficulty the participant may be experiencing. Observers from the institute or agency will be welcome during the testing, however test protocols require the observers to remain anonymous and not in contact with participants.

Data Collection

The test administrator will note how participants move in their attempt to accomplish a task. An emphasis will be placed on understanding the logic that users are following to accomplish their task so we will ask them to "think aloud." This will interfere with obtaining strict timing information although we will note both time and errors.

After completing the sequence of tasks, participants will be asked to briefly evaluate the Web site using a Likert scale questionnaire and asked to offer suggestions and comments about the site.

Analysis and Report

The test administrator will review test notes and selected segments of the videotape as needed, from each test session. The data to be aggregated include:

- Summary and range of comments on the simplicity and understandability of the site
- The quantity of correct and incorrect attempts (i.e., errors) to complete tasks
- Mean and range values for Likert scale ratings of the ease and importance of specific capabilities
- A summary of post-test comments

Usability problems are categorized by severity, judged on probable frequency and likely impact on productivity. The report will include key differences, if any, among the three participant groups.

APPENDIX A-5. USABILITY PILOT TEST DOCUMENTS

CONTENTS

ATTACHMENTS

ATTACHMENT A: SCREENING QUESTIONNAIRE

Appt. Date & Time: _____

Directions Sent: _____ Recruiter: _____ Reminder Call: _____

Screener for [institute or agency name] Web Study
[DATE]
[NUMBER] Participants Needed
[LOCATION]; [NUMBER] hours; [$ HONORARIUM]

Name: _____

Daytime Phone # _____

Evening Phone # _____

1. Gender Male _____ Female _____ (Recruit an equal mixture)

2. Which of the following categories includes your age? (Recruit a mixture)

Under 18	_____	(Terminate)
18 - 24	_____	
25 - 35	_____	
36 - 45	_____	
46 - 65	_____	
Over 65	_____	(Terminate)

3. How many hours per week, including work and home, do you use the Internet? (not including email)

Less than 5 hours	_____	(Terminate)
More than 5 hours	_____	

The following three questions (4a-4c) are ones to determine individuals appropriate for our study. Terminate if NO to all three questions.

4a. Do you have any condition that limits your ability to use a computer or the internet?

No	_____	
Yes	_____	(Recruit 1 visually challenged; 1 with motor challenges; 1 with language or learning challenges)

4b. Do you have a special interest in new medical discoveries or in new insights into a healthy life styles?

No _____
Yes _____ (Recruit 3)

4c. Do you or does some one in your family have experience with a serious or chronic medical condition?

No _____
Yes _____ (Recruit 3)

5. What is the highest level of school you completed? (Recruit a mixture)

_____ High School
_____ 2-Year College
_____ 4-Year College
_____ Masters
_____ Advanced

6. The study session will be video taped. Only the team working on this project will use the tape and your name will not be associated with the tape or other data in any way. You will be asked to sign an informed consent form. Will you consent to being video taped?

Yes _____
No _____ (Terminate)

How would you like the directions to the study site sent to you?

Email _____ Email Address _____

Fax _____ Fax Number _____

Over Phone _____

ATTACHMENT B: DEMOGRAPHICS QUESTIONNAIRE

PARTICIPANT BACKGROUND INFORMATION

Participant No._____

DEMOGRAPHIC INFORMATION

Name

_____

Age: _____< 21 _____ 21-29 _____ 30-39 _____ 40-49 _____ 50-59 _____ 60+

Gender: _____ MALE _____ FEMALE

EDUCATIONAL EXPERIENCE (Highest level completed):

_____ High School _____ 2-Year College _____ 4-Year College _____ Masters _____ Advanced

EMPLOYMENT EXPERIENCE

Job Title of Occupation:

_____

Industry (Type of Employer)

_____

MEDICAL / DISEASE BASED EXPERIENCE

Do you have a special interest in new medical discoveries or in new insights into healthy life styles? _____

Describe your interest.

_____

_____

Do you have extensive experience with any particular medical condition(s)? _____

If yes, who in your life has the disease(s)?

_____

Where have you learned about the disease(s)?

_____

On a scale of 1 to 10 with 10 being expert and 1 having barely any knowledge, rank your understanding of the disease(s). _____

COMPUTER EXPERIENCE

Regularly used a computer?
__ Not at all __ Few weeks __ 2 - 6 mos. __ 6 – 24 mos. __ > 2 yrs

Regularly used email or online services (e.g., AOL, Prodigy, Compuserve) ?
__ Not at all __ Few weeks __ 2 - 6 mos. __ 6 - 24mos. __ > 2 yrs

Regularly used the Internet using a browser (e.g., Netscape, Internet Explorer)?
__ Not at all __ Few weeks __ 2 - 6 mos. __ 6 - 24 mos __ > 2 yrs

Approximately how many hours per week do you use:

A computer (at work or otherwise)? _____hrs

Email or online services (e.g., AOL, Prodigy, Compuserve)? _____hrs

The Internet using a browser (e.g., Netscape, Internet Explorer)? _____hrs

Which of the following have you done over the Internet (or an Intranet)?

__ Browse with no specific purpose (using links and Back and Forward browser buttons)

__ Search for specific information using a search engine

__ Bookmark Web sites of interest

__ Enter and submit information through forms (such as software registration)

__ Change the basic preferences or settings in your browser such as fonts, colors, starting home page

__ Had on-line conversation with one or more people using Chat Rooms or similar capabilities

__ Used on-line services (e.g., AOL, Prodigy, Compuserve)

__ Bought a product or service (e.g., make hotel/travel reservations or order products such as books, CDs, electronic goods etc.)

__ Visited the Web site of interest

ATTACHMENT C: INFORMED CONSENT / VIDEO RELEASE FORM

Video Release Form

For [institute or agency name] Web Study

Video recordings made during this study will be used for research and development. Therefore, I understand that my work during the evaluation will be recorded and viewed by the staff of [contractor], and their client, _____. I further understand that [contractor] or [client] may wish to use segments of these recordings to illustrate presentations offered to professional audiences.

I give my consent to [contractor] and/or [client] to use my recorded image and voice for these purposes, with the provision that my name will not be associated with the recording and that these recordings will not be released to any broadcast or publication media.

I, _____, freely and voluntarily consent to participate in a Web site evaluation. I understand that my participation in this evaluation is completely voluntary. I also understand that I may withdraw my consent and discontinue my participation at any time without penalty or prejudice to me.

***I have read and understood the foregoing and understand that I may receive a copy of this form, upon request, on the day of the study*.**

Participant's Signature: _____**Date:** _____

ATTACHMENT D: FACILITATOR'S GUIDE AND FINAL QUESTIONNAIRE

I. INTRODUCTION

Thanks for participating today. As you know, we will be discussing and working with a Web site. Some key things to remember as we go are:

1. There are no right or wrong answers, we are not testing you or your abilities to use the Web.
2. We are interested in your feedback, positive or negative about what we are looking at.
3. Neither I nor anyone here at UserWorks designed the site we will use, so you can't hurt our feelings and my job does not depend on your evaluations or comments. You're helping [institute or agency name] review the site for how it works and what it says.
4. As you know, we are videotaping the session, but that is only for our review of the findings. You signed the consent form earlier and you remember that if you want, you can quit at any time.
5. Everything you say is confidential and will only be used in combination with the feedback we get from other people.

Do you have any questions before we begin?

II. BACKGROUND {3 - 5 MINUTES}

Before we log on to the Web, let's cover a few background items.

1. First please tell me in general what motivates you to look for information on the World Wide Web, and by that I mean not just what people call "surfing" but actually looking for information about something specific?

   Probe:

   - *Generally, what is better or worse about seeking information from the Web versus other sources?*

When we first called you, we asked if you've ever searched for information on _____. Today, we want to show you a Web site on health information and get your opinions about parts of it.

2. But first, please tell me what kinds of things you would expect on a health-related Web site.

III. ON-LINE {30 – 40 MINUTES}

Ok, good. Now let's look at a Web site created and administered by the [institute or agency name]. While it is logging on, please tell me briefly what you know, if anything, about [institute or agency name].

{Mention this to all.} The [institute or agency name] is the Federal Government's principal agency for _____.

{After logged on}:

3. What do you think about this home page?

I have a series of items and tasks to cover, but again please remember this is not a test of your ability to use the Web.

Also, while you do things on the site, I need to ask you to do something you probably don't do often, and that is think out loud about what you are seeing and doing. *(We will not be closely measuring the time it takes individuals to accomplish their tasks since we want more personal, qualitative feedback.).* I'll be taking notes while you're checking out the site.

Groups:

> Individuals who are members of the general public interested in a healthy life style or members of the public touched by disease group will be asked to do tasks A and B. Next they will be asked to select a task, one at a time, from among tasks C-G (described below) until their time for testing is complete.
>
> Individuals who are accessibility challenged will be offered the opportunity to do any of the described tasks. If there is time, they will be asked to do another of the tasks.

Tasks:

A. Your first task is to find information about a specific disease. So pick a disease that you might want information about. You will need to tell us generally what you already know about the disease and what you want to find out about it. Then just look for the information. {Ask individuals in the touched by disease group if they would be willing to search on that topic. Otherwise, choose one from the following list: prostate cancer, Addison's disease, Crohn's disease, depression, Guillain-Barre syndrome, amyotrophic lateral sclerosis.}

   {Note whether they begin with navigation through the structure or search-engine strategy.}

B. Let's do another search on a specific disease. Please pick another disease, and look for information, but also first tell me generally what you already know and what want to find out.

C. You just caught just the end of a story on the radio or TV news about _____ and you are interested in learning more. Find more information on the Web site.

D. You are interested, as a tax paying member of the public, in how [institute or agency name] spends its money. Find recent [institute or agency name] budget information, either dollar figures or a discussion of how spending priorities are decided, on the Web site.

E. You wonder what [institute or agency name] might offer your favorite high school student in the way of a summer job. What can you find out about summer jobs and the deadline for applying?

F. Someone has told you about a lecture regarding _____ that is supposed to take place at [institute or agency name] on Wednesday, January 26. It sounded like it would be of interest, but you forgot where at [institute or agency name] it would be. Find out the location and find specific directions to the precise location of the lecture.

G. You are looking for a toll-free number to call for information on _____. See if you can find one on the site.

Procedures to follow on each task:

1. If **NAVIGATING** through the site, *{after each click, ask}* is this what you expected to see? Please elaborate.

   {Probe}

   Where are you?

   What is offered on this screen?

   Was coming here progress toward your goal? Why or why not?

   What seems like the best next choice? Why?

   IF BEGIN WITH SEARCH ENGINE:

   What can you do if you don't know how to spell the condition you are looking for?

   Do you think the search will include general information about the condition or only information specific to what [institute or agency name] is studying regarding that condition?

   How current would you expect the information to be? Why is that?

2. Ok, let's continue to find the information that we started looking for and rather than me asking questions, please remember to think out loud about how you will choose where to click, what you expect the click to return, and your reactions to what is returned.

   {Continue to observe navigation and choices, and participant reactions, with minimal interaction other than to remind them to think aloud about:

Where are you?

What is offered on this screen?

Was coming here progress toward your goal? Why or why not?

What seems like the best next choice? Why?*}*

{When participant gets in trouble or frustrated, ask questions that can help solve problems:

- Where are you?
- How did you get here?
- What is offered to you on this screen?
- What did you expect to be the result of your clicking to here? Did it happen?
- What looks like a good, or the best, next choice?*}*

{Only if necessary, guide them back at least one screen; but if absolutely necessary, guide them back to the home page.}

FOR SEARCH ENGINE

{When appropriate, note reactions to mass-quantity hits, and be ready to ask}

What does the Rank Score mean?

Would you like to be able to narrow this search? If yes, what choices are there to narrow it?

Describe the information given here?

{Alternatively, if there are only a few hits or no hits, ask if that result seems reasonable. If the answer is no, ask what they think happened and why}

3. *{When participant appears finished}*

What did you find?

{Probe, including requesting elaboration or explanation}

Is it what you wanted?

Is it helpful?

Do you understand what is here? Elaborate.

Was the process for obtaining this material satisfactory?

{If participant seems unwilling to continue}

If you were at home alone what would you do now…

Could I help you here?

4. From here, how would you return to [institute or agency name] home page? *{Let them try, and guide them or answer questions only if necessary}*

{When back at the home page} Let's go over how you went about the task. Please tell me how you decided where to go first, from this home page, and then discuss your experience during the search.

{Specific spoken probes to get immediate feedback on the task just accomplished:}

Were there problems in navigation?

1. On a scale from 1 to 9 with 9 being easy and 1 being difficult, was it easy or difficult to find this information?
2. Do you have any suggestions or comments about getting to the material?

Is there a problem with the content?

1. On a scale from 1 to 9 with 9 being easy to understand and 1 being difficult to understand, was it easy or difficult to understand this information?
2. Do you have any suggestions or comments about the material that you found?

POTENTIAL ADDITIONAL AREAS OF INQUIRY (Time Permitting)

H. What, if anything, can you do to contact [institute or agency name] to get a real person to talk to you personally about _____ *{the topic selected}?*

I. *{If participant never left the [institute or agency name] site during their searches}* Let's look for information about {_____}, but I will guide you on how to start. *{Guide them to a place where the next click leaves the [institute or agency name] site, and then ask them to proceed with a search}*

Probe:

- Where are you?
- How did you get here?
- What is offered to you on this screen?
- Where did you think this screen would go, or what did you expect to be the result of your clicking to here?
- What looks like a good, or the best, next choice?
- *{If participant does not realize the [institute or agency name] site was exited}* Are we still somewhere in the [institute or agency name] Web site? *{If yes or no}* what makes you think so?
- Actually, we have left the [institute or agency name] site, so let's try to get back to it. *{observe how they try, and if necessary, provide guidance}*

J. What do you think about the fact that the task took you to a different Web site than the [institute or agency name] site?

{We will evaluate quickly as we progress through testing as noted above. In addition, a written questionnaire will be used at the end.}

FINAL QUESTIONNAIRE

Please circle the numbers that reflect your impressions of the [institute or agency name] Web site.

1. Overall reaction to the site:

frustrating	1	2	3	4	5	6	7	8	9	satisfying

2. Using the site was

difficult	1	2	3	4	5	6	7	8	9	easy

3. Information on the pages was arranged

illogically	1	2	3	4	5	6	7	8	9	logically

4. The amount of information on the pages was

too little	1	2	3	4	5	6	7	8	9	too much

5. Selecting the right words for the Search was

difficult	1	2	3	4	5	6	7	8	9	easy

6. Understanding the match between the material searched for and the material returned was

confusing	1	2	3	4	5	6	7	8	9	straight forward

7. Understanding the material returned was

difficult	1	2	3	4	5	6	7	8	9	easy

Were there any parts of the site that you found especially helpful?

_____

_____

_____

Were there any parts of the site that you found especially difficult to use or understand?

_____

_____

_____

What are your suggestions or comments about what would make the site better?

_____

_____

_____

APPENDIX A-6. EMAIL CONTENT ANALYSIS PILOT TEST

Summary of Email Content Analysis

1. Introduction/Purpose

Every month, the agency team of information specialists responsible for processing email messages regarding comments, questions, and/or feedback receives several hundred email requests from the public. These requests provide valuable insights into the kinds of informational needs users have and the types of problems they may be encountering with the Web site. To better understand users' needs and experiences, a content analysis of the emails was performed. Content analysis is a methodology that seeks to find patterns in textual data. Results of this email content analysis provide a deeper understanding of the types of requests people send. Although it is important to note that these email requests represent a self-selected sample of the overall Web site user population, the results of this analysis should position the agency to better anticipate users' needs and minimize possible problems they may encounter.

2. Methodology

Three months of emails that were sent in October, November, and December, 1998 were obtained in an electronic file. The total number of emails from those three months was estimated to be 1,629 messages. A random sample of 10% of the emails was drawn, resulting in 162 emails to be used in the content analysis.

The analysts devised a coding scheme, modeled after the taxonomy developed by Hert and Marchionini for the Bureau of Labor Statistics email content analysis.[12] The coding scheme was further modified based on inductive strategy—an analyst reviewed a five percent subset of the 1629 emails (86 emails), and developed coding categories. When there appeared to be no new categories being added to the scheme, the preliminary scheme (and associated coding rules) were formalized. Another analyst then received the scheme and both analysts coded the same subset of the messages. Coding decisions were jointly reviewed to confirm that the scheme was detailed enough for any coder to reach the same decisions.

Cohen's kappa statistic was used to verify reliability of the three dimensions of the coding scheme (content, strategy, and requestor) and to ensure inter-rater reliability. Kappa considers the number of decisions made and the expected occurrence of agreement if chance alone was operating. A value of .60 or higher is generally considered sufficient to indicate that chance

[12] Hert, C. A., and Marchionini, G. 1997. *Seeking Statistical Information in Federal Websites: Users, Tasks, Strategies, and Design Recommendations*. Final Report to the Bureau of Labor Statistics. http://ils.unc.edu/~march/blsreport/mainbls.html. This report describes the sample selection, email coding scheme, and analysis of emails received by the BLS. Other standard references on content analysis methodology are: Holsti, O.R. 1969. *Content Analysis for the Social Sciences and the Humanities.* Reading, MA: Addison-Wesley. Krippendorf, K. 1980. *Content Analysis: An Introduction to its Methodology*. Beverly Hills, CA: Sage Publications.

alone is not accounting for the agreement. Kappa scores obtained in the pilot test were as follows:

Content	= .72
Strategy	= .73
Requestor	= .82

After confirming that the coding scheme was reliable, the analysts proceeded to code all 162 email messages; 46 messages contained multiple questions, resulting in total of 208 email questions.

3. Coding Scheme

As stated above, the emails were coded on three dimensions: Content, Strategy, and Requestor. Below is a detailed description of each dimension.

Dimension 1—Content

Content: This dimension describes what type of information the user requested	
System	Questions query specifically about the Web site, including questions relating to how the Web site is organized/unorganized; changes and/or modifications related to the Web site.
Health Information	Questions relate to information or data regarding a specific health problem or disease (such as, "Can you provide me with information about asthma?" or "I need information about the treatment of prostate cancer.") including the treatment of the disease, related statistics, research studies, clinical trials, etc.
Data-Information—other	Questions relate to requests for data/information that are not health- or disease-related, but are relevant to [institute or agency name's] mission (such as, "Can you tell me more about [institute or agency name's] position regarding the ethical treatment of human subjects in research studies?" or "Does your organization provide laboratory specifications for microbiological hazard handling?").
Publications	Questions relate to requests for and about [institute or agency name] publications, including pamphlets, reports, consensus statements, etc.
Agency Administration	Questions relate to administrative processes at [institute or agency name], including job/internship opportunities at [institute or agency name]; grant applications; formats for CVs; etc.
Contact Information	Questions relate to contact information for a specific person/persons, such as phone number, email, address, etc. ("Can you please provide me with an email address for Dr. X?" or "Who is the head of _____ at _____?"). The questions *must be* in relation to a specific person or position, not simply "who is responsible?"
Other/Not Codeable	Questions cannot be coded in categories #1-6 or the information in the email is inadequate, non-sensible, or simply non-decipherable; also includes information requested from [institute or agency name] that is not part of its mission (such as, "Can you please tell me more about TANF?").

Dimension 2—Strategy

Strategy: This dimension describes what the user wants to know about the information they indicated and what form the question took	
What	Requests are for clarification, content, or definition of the content information; also includes "Why" questions—requests for the rationale for something; "Is it an error"—requests asking about system/computer errors; and non-descript requests for information to be sent (e.g., "Please send me information about . . .") or for information to be sent via email—the request *is not* for a hard copy to be sent.
How ("How to. . ." or "How do I . . .")	Requests are for process-related issues. Questions such as, "How can I access information on the Web site?" would be included in this category because they ask specifically about the process of obtaining the information and not the location of the information. Questions such as "How do I find information on . . ." would *not* be included in this category—they would be included in "Where."
When	Requests are for the timing of something, such as "When will the publication be available/released?"
Where	Requests include location/access to information, including directions to answer questions such as "Can you direct me to. . ."; used only when the respondent explicitly asks about location, as opposed to simply the existence of information or "they can't find something".
Do you have?	Requests are to determine the existence of the information, such as "Are there any. . ." or "Have you heard of . . .?"
Who	Requests ask about who is responsible, who to contact, etc. They are *not* asking about a specific person.
Please Send Hard Copy	Requests ask [institute or agency name] to send a specific piece of information/publication that is a tangible product; these requests require a higher level of effort on [institute or agency name's] part to respond, than simply replying to the email.
Other/Not Codeable	Requests cannot be categorized into #1-7; or, the information in the email is inadequate, non-sensible, or simply non-decipherable; also includes information requested from [institute or agency name] that is not part of its mission.

Dimension 3—Requestor

Requestor: This dimension attempts to identify the type of person making the information request; this information should be easily identifiable through the email message; the requestor may state his/her identity (such as "I am a physician")	
Health Care Professional/Practitioner	Includes persons writing request on behalf of a health care professional/practitioner
Student/Educational Affiliation	Includes ".edu" addresses
Journalist/Media Professional	Includes authors
Government Employee	Includes ".gov" addresses; both federal and state govt.
General Public	Includes requestors who cannot be classified into other categories
Other Professional	Includes requestors who have stated/specified their occupation

4. Coding Rules

The following coding rules were implemented when conducting the analysis:

- All questions in each email are coded. Thus, if a requestor says, "Do you have information on _____ and if so, where can I find it?" the email would be coded with two questions: a "health info/do you have?" and a "health info/where." Multiple examples of the same type of request should only be coded once. For example, if a requestor says, "Can you tell me more information about _____? What is _____ used for?" he/she has made two "health info/what" requests; this should only be recorded one time.

- Code each question on all three dimensions (content, strategy, and requestor).

- Use the respondent's language to help determine which type of question it is; follow the descriptions given for each category within the three dimensions.

- When coding "requestor," look for information contained in the email, such as a stated profession, academic letters (e.g., M.D., Ph.D.), and email address extension (e.g., ".gov", ".edu"). If there is no indication of type of requestor, code as "5–general public". If there is more than one category in which a person could be coded (e.g., "John Doe, M.D." with an email address of "johndoe@university.edu"), examine the content of the email to determine in which vein the person is making the request. If a decision cannot be reached from reviewing the email content, choose the first category that appears in the

"requestor" list. (In the John Doe, M.D. example, this requestor would be coded as "1—Health Care Professional/Practitioner" as opposed to "2—Student/Educational Affiliation").

- In the coding file, each email message should be listed by email address. If there are multiple questions within each email, they should be numbered consecutively starting with the second request and higher. For example, if John Doe had two questions in his email, the coding file would contain the following listings:

  johndoe@university.edu
  johndoe@university.edu-2

- All email addresses should be entered into the coding file in lowercase letters.

- It is recommended that analysts coding the email messages be highly familiar with the [institute or agency name] and its mission; familiarity with qualitative analysis is also recommended.

5. Summary of Email Content Analysis Procedures

In order to effectively carry out an email content analysis, the following steps are recommended:

- Work with client (institute or agency representative) to determine which potential categories (for all three coding dimensions) are of interest.

- Develop detailed descriptions of each category within the three dimensions.

- Inductively derive any additional categories/dimensions and/or modify preliminary categories.

- When it has been determined that no new categories/dimensions are to be added/modified, finalize descriptions of each category/dimension (and associated coding rules).

- Review extensively with client and analysts, descriptions of categories to ensure that all participants understand the dimensions, categories, and associated coding rules.

- Have two analysts code the same sub-sample of messages (at least 10%); perform kappa statistics on all coding dimensions to determine inter-rater reliability; kappa of .60 or higher considered acceptable to indicate that chance alone is not accounting for the agreement.

- If kappa is lower than .60, determine differences in coding and review process and results with analysts; make modifications to coding scheme, as necessary; after review, code additional subset of messages and perform kappa to ensure higher agreement.

- After reaching acceptable kappa, divide remaining message between two analysts for coding.

APPENDIX A-7. SUMMARY OF PROCESS FOR CONDUCTING AN ONLINE FOCUS GROUP

CONTENTS

ATTACHMENTS

Process for Conducting an Online Focus Group of a Web site

Focus groups have proven to be an excellent means of collecting qualitative research information from a group of participants, and are traditionally conducted in-person. With advancing technology, we now have the ability to conduct focus groups online and collect qualitative data over the Internet. Participants no longer have to physically come together to share in a focus group experience; they simply log onto a designated area on the Internet at a pre-scheduled time and communicate in a group setting, through their computers. Once the online focus group is underway, questions and answers occur in "real time"—there is virtually no delay in the time a message is typed and displayed on the screen so that all participants may see it—information is shared almost as instantaneously as if the people were all physically in one room.

Each online focus group requires at least 2 participating staff: an administrator and a moderator. The administrator manages the technical aspects of the event (including access, security, transcription, preparation of visuals, moderator training, etc.). The moderator interacts with the client to prepare the moderator's guide and with the participants as the event moderator.

Features of Online Focus Groups

- They provide the ability to restrict access to pre-authorized participants.
- There is an automatic production of instant word-for-word transcriptions.
- They provide the ability to use online fill-in survey forms without leaving the focus group.
- They provide the ability to have online participant profiles filled out in advance (reduces the need for "get acquainted" activities).
- They have elaborate electronic moderator discussion controls.
- They provide the ability to display (with no action needed by participants) of discussion materials such as slides, charts, spreadsheets, concept papers and other text materials.
- They provide the ability to continue discussion on a split screen while viewing materials such as those described above.

Advantages and Disadvantages of Online Focus Groups

- Distance and travel costs are eliminated for both participants and moderator/administrators. Anyone in the world with a computer, Web browser, and Internet access can participate. On the other hand, focus group participants must obviously have computer access and a basic level of computer literacy.

- Typing on a keyboard can be slower than talking aloud. However, comments are often more thoughtful and useful when participants are required to put them into writing. And a transcript is automatically produced, eliminating many hours of labor to transcribe recorded conversations.

- Online focus group moderators give up the ability to observe facial expressions, body language, side conversations, and other group dynamics. However, an online focus group may provide more objective information in that participants are not as easily influenced by group dynamics or moderator appearance and personality.

- Online focus groups can easily recruit participants from across states, regions, and even national boundaries. Traditional focus groups may often pay expensive travel costs for moderators and other staff, but will ordinarily be limited to an immediate local area from which to draw participants in a given focus group.

- Online focus groups are particularly appropriate for topics that relate to technology itself such as online simulations, company Web sites, online advertising, online databases and information sources, and many others.

- Internet-based conferencing—especially using dial-up modem connections—is not a perfect process. Power surges, phone line traffic, computer lockups, server malfunctions, and other maladies present occasional challenges. However, traditional focus groups can also be affected by power outages, airline cancellations, ice storms, equipment problems, etc.

Following is a table that details the steps/process used in the online focus group conducted for a Federal agency to evaluate its Web site. Included in the table are a description of each step/process and notes regarding that step/process with regards to the online focus group.

Steps/Process	Description	Notes Regarding Pilot Online Focus Group
Recruitment		
Determine user population to participate in online focus group.	Work with client (institute or agency representative) to clarify different user groups of Web site and determine which group(s) will participate in online focus group(s).	For this online focus group, it was determined that participants would be persons seeking health-related information for a healthier lifestyle and/or persons personally touched by disease.
Develop Recruitment Screener to be placed on institute or agency's Web site.	The recruitment screener serves as an invitation for users to participate in the online focus group(s). If a particular user group has been pre-determined, screener should filter for this population. Screener also filters for hardware and software necessary to participate in online focus group.	See Attachment A for the recruitment screener developed for this online focus group.
Work with institute or agency's s Web master to place a link on Web site to screener.	The screener is the primary method for recruiting participants for the online focus group. A link to the screener should be placed on the home page of the Web site, in a highly visible location. The link's text should be intriguing, yet short; it should also be eye-catching (e.g., colorful , flashing , and/or large text). It should inform potential participants of the date and time of the online focus group, as well as inform them of the length of the group and any incentives for participation.	The placement of the screener is critical to recruit a wide variety and large enough pool of potential participants.
Monitor the number of positive responses to recruitment screener.	As users respond to the screener, monitor the number of positive responses (i.e., those who wish to participate as well as those who have the necessary hardware and software). The ideal number of participants in an online focus group is 8-12. Because of various issues (e.g., date/time of group, time zone of participant, length of focus group; hardware/software incompatibility; loss of interest; etc), attrition from initial recruitment to actual participation is fairly high. Maintain link to recruitment screener on Web site until suitable number of potential participants has been reached.	Recruitment for this pilot online focus group was not done through a link on the Web site to the recruitment screener. However, from previous experience with online focus groups conducted for another similar client, we found that only about 10% of users who initially showed an interest in participation actually did participate in the online focus group. Therefore, a successful recruitment strategy would attempt to engage about 10 times the number of participants needed for the group.
Develop follow-up email letter to be sent in response to recruitment screener.	The follow-up email letter is intended to thank the user for responding to the recruitment screener and confirm their interest in participating in the online focus group. The follow-up message also instructs participants to perform a test login between certain dates to ensure that they are willing and capable of participating in the group. It also provides a	See Attachment B for the follow-up email letter developed for this online focus group.

Steps/Process	Description	Notes Regarding Pilot Online Focus Group
	contact person's name and phone number, should they have any difficulties or questions.	
Respond to potential participants with follow-up email letter.	Within a day or two of receiving a positive response to the recruitment screener, follow-up with the potential participant by sending him/her the follow-up email letter. Sending this email promptly after receiving their positive recruitment screener will help to reduce the risk of their losing interest.	Although we did not recruit via the Web site for this pilot online focus group, we did send the follow-up email letter to focus group participants.
Test Login	The online focus group administrator develops a test login site. The procedure of a test login serves as another indicator of the user's intention to participate. It also serves as a very useful method of reducing "no shows" to the online focus group due to technical problems. The test login procedure and site should be developed simultaneously with the recruitment screener, so that as users respond positively to the screener, they can immediately begin the test login.	Participants for this pilot online focus group were required to complete the test login procedure.
Monitor the number of successfully completed test logins.	As users successfully complete the test login procedure, you will get a more realistic idea of how many people will actually participate in the online focus group. The test login site should be monitored daily. The recruitment screener should remain posted on the home page of the Web site and follow-up email letters should continue to be sent until enough test logins have been completed to hold a focus group.	We have found from experience with online focus groups conducted for another similar client that about 86% of users who successfully complete the test login procedure will participate in the online focus group.
Send reminder email to potential participants the day before the online focus group.	To foster participation, it is a good idea to remind potential participants of the date and time of the online focus group, the day before the group, by sending an email and/or making a phone call. If the group is being held in the evening, a reminder can be sent that same day in the morning.	Because recruitment was not traditional for this pilot online focus group, no reminder email was sent. However, an example of a reminder email can be seen in Attachment C.

Steps/Process	Description	Notes Regarding Pilot Online Focus Group
Preparation for Online Focus Group		
Develop Moderator's Guide for online focus group.	Work with client (institute or agency representative) to determine research questions to be answers through online focus group. Develop a guide to be used by the Moderator during the online focus group, that asks these research questions (and associated probes) in an open-ended fashion.	See Attachment D for the Moderator's Guide developed for this pilot online focus group.
Develop online presentation materials.	The administrator and moderator prepare the presentation materials to be used during the online focus group. Presentation materials include discussion elements such as slides, charts, spreadsheets, concept papers and other text materials.	For this pilot online focus group, presentation materials simply consisted of textual slides of the focus group research questions.
Develop online feedback survey.	The administrator and moderator develop a short, online feedback survey that asks participants about their experiences and opinions about the online focus group process. The online feedback survey is conducted after the online focus group is completed. The feedback survey also asks participants for their mailing addresses, so that if an incentive is being offered for participation, it can be mailed to them.	See Attachment E for the online feedback survey developed/used for this online focus group.
Conduct an online focus group walk-through.	To test the system, moderator's guide, and presentation materials, the administrator and moderator conduct an online focus group walk-through. The walk-through serves as a "dry-run" of the online focus group, allowing the administrator, moderator, and client to identify any areas of the materials and/or procedures that may need modification. Other people (such as mock participants) may participate in the online walk-through by simply logging on at scheduled time. The online walk-through should be conducted within one week of the online focus group.	An online walk-through was conducted within one week of this online focus group. Typographical corrections were made to the presentation materials.
Implementing the Online Focus Group		
The online focus group meeting takes place.	The moderator will present questions to the group (which participants will see on the screen). Participants will respond to the question by typing their responses and sending them to the screen. The viewing screen can be split in two so that any visual materials can be	This pilot online focus group meeting took place on Wednesday, February 16, 2000 from 7:00 - 9:00 p.m. ET.

Steps/Process	Description	Notes Regarding Pilot Online Focus Group
	presented on the top screen to participants, while in the bottom screen the group discussion will take place. The administrator controls the display of presentation materials and also can control the various technical means of moderating the discussion, screening and sequencing participant comments, assigning speaker privileges, and interacting, as needed, with the moderator.	
Transcript of online focus group meeting developed/edited.	A transcript of the online focus group meeting is automatically generated. This transcript records all interactions that occur during the online focus group. The transcript can be edited to eliminate typographical errors, as well as ensure confidentiality of participants by changing any identifying information (e.g., names, usernames) to systematic code names (e.g., a username of "johnd" would change to "participant 1"). The edited transcript may optionally be Emailed to participants for further comment and clarification. This step may elicit further valuable information. An alternate means of doing this is to post the transcript online in a threaded discussion forum. Participants then access the designated URL, review the transcript, and post their comments online.	The transcript from this pilot online focus group was not sent to participants for further comment or clarification.
Tabulate results from online feedback survey.	The administrator provides the moderator and/or analyst(s) with tabulations (automatically generated) of the results from the online feedback survey, conducted at the end of the online focus group. These results can be used to refine the online focus group process, questions, etc. as needed.	Results from the online feedback survey have not been incorporated into the online focus group methodology nor have modifications been made to the moderator's guide.
Preparation of written analytical report.	After the transcript of the online focus group has been edited, the contents should analyzed and written into an analytic report for the client. This report should highlight all major issues addressed for each of the research questions posed in the online focus group. Any additional comments/insights given by participants in the group, beyond those addressed in the research questions, should also be analyzed and included in the report. The report should include the full, edited transcript and hard copies of the selection criteria, presentation materials, survey forms, and recommendations in an executive summary format.	Because this online focus group was intended to test methods, rather than content, an analytical report was not written. Instead, this document serves as the analytical report for this pilot online focus group.

Lessons Learned About Online Focus Groups

Our experiences with conducting this online focus group as well as conducting online focus groups for many other Federal clients, have taught us the following lessons:

- Recruiting can be difficult—it may be the most challenging part of the process. Recruitment is most successful when a date and time for the group is established, prior to beginning the recruitment process.

- The test login process is very useful in reducing "no shows" to the online focus group due to technical problems. Test logins should always be required.

- Adequate information about focus group participants is required in advance, particularly requiring a name, email address, and phone number. This information facilitates contact and helps foster participation.

- It is necessary to assure that no participants use less than 800x600 screen size. The experience of having someone in a group using 640x480 is frustrating and disruptive.

- Since many users know little about the setting of their screen and various other technical aspects about their personal computers, having a toll-free technical assistance telephone line established is important.

- Moderators benefit greatly from larger monitors. A 17" monitor set at 1024x768 should be considered absolutely minimal. A 19" or 21" monitor would increase moderator effectiveness.

- Moderators need specific training in online moderating. The fact that a person is an experienced and skilled moderator of traditional focus groups does not mean he/she is ready to conduct online focus groups.

- An assistant moderator is needed for moderated focus groups to help keep track of the queue. It is also valuable if the assistant moderator is someone with content or client experience.

- The use of private messages to participants having problems or being disruptive is very useful and the technical administrator can often handle these needs.

- Group size of the focus groups is ideal with 8-10 participants, although there are some advantages to both larger and smaller groups.

- Client participation in the "dry run" of the focus group is useful. New clients need education and orientation to the online focus group process.

Attachment A

Recruitment Screener
To Be Placed on [institute or agency] Web site

Welcome to the [institute or agency] Web site!

We are currently reviewing use of the [institute or agency] Web site and considering changes for the future. We will be conducting online focus groups with users of the [institute or agency] Web site to learn more about their experiences, perceptions, and satisfaction with the Web site. We are planning to hold the online focus group on DATE at TIME. The group would consist of 8-10 participants and would last approximately 2 hours. We would like to offer people who are selected AND complete the focus group an honorarium of $40.00 as compensation for their time.

The results of the online focus groups will help the [institute or agency] plan for the Web site's future, so your input is very important to us!

You can help us by answering several questions:

1. Have you used the [institute or agency name] Web site previously? (Choose only one)

   ☐ This is my first time
   ☐ I use the [institute or agency name] Web site occasionally (less than monthly)
   ☐ I use the [institute or agency name] Web site at least once a month
   ☐ I use the [institute or agency name] Web site weekly

2. Which of the following best describe you? (Choose only one)

   ☐ Person seeking health-related information for a healthier lifestyle
   ☐ Someone personally touched by disease

3. Do you have Internet access at:

   ☐ Home
   ☐ Work
   ☐ Both

4. If you have Internet access at work, is your computer system behind a "firewall?"

   ☐ Yes
   ☐ No
   ☐ Unsure (if you are unsure, you can check with your system administrator)

5. What time zone are you in?

   ☐ Eastern
   ☐ Central
   ☐ Mountain
   ☐ Pacific

☐ Other International (specify country):

6. Are you willing to participate in an online focus group, which would last for approximately 2 hours, to discuss your experience(s) with the [institute or agency name] Web site?

☐ Yes
☐ No

In order to ensure that you have the necessary computer hardware and software to participate in the online focus group, please indicate which of the following features you have ON THE COMPUTER YOU WOULD MOST LIKELY BE USING WHEN YOU PARTICIPATE in the online focus group:

MARK ALL THAT APPLY

☐ Windows 3.1
☐ Windows95/NT
☐ Macintosh

☐ Netscape 3.0 (or later)
☐ Microsoft Internet Explorer 3.0 (or later)

☐ Monitor resolution 800x600 (or higher)

If you don't know what your monitor resolution is, you can check by following these steps:

Windows 3.1 Users
- Open the "Main" icon
- Open the "Windows Setup" icon
- Look at the line marked "Display:" to determine your current monitor resolution; it will look something like:

Display: S3 864 1.4381 **800x600** 256 colors SF

Windows95 Users
- Click the right mouse button
- Select "Properties"
- Select "Settings"
- Look in the middle, right of the screen called the "Desktop Area" to determine your current monitor resolution

If you wish to participate in the online focus group, please provide your email address and/or your telephone number so that we may contact you about your participation.

email:

phone number:

If you have any questions about the online focus groups that you'd prefer to discuss by telephone, please feel free to call [Contact Person] with [Organization] at [Phone Number].

Thank you!

Submit Answers | Return to [institute or agency name] Web site | Clear Form

Attachment B—Follow-up Email Letter

Follow-up to Recruitment Screener
To Be Sent by Email

Thank you for responding to the online questions regarding the [institute or agency name] Web site online focus group. We would like to invite you to participate in an online focus group, scheduled for **DATE,** from **TIME to TIME**. This group will be comprised of approximately 10 people.

To reaffirm your intention to participate in the online focus group, we ask that you perform a test login (instructions given below) between the dates of **XX/XX and XX/XX**. If you do not successfully complete the test login between those two dates, you will not be able to participate in the online focus group. If you have questions about the test login instructions or experience any difficulties, please feel free to contact **[Contact Person]** by email **[Email Address]** or by telephone **[Phone Number]**.

If your schedule does not allow your participation in the group, please email **[Contact Person] [Email Address]** and state that you will not be participating.

[institute or agency name] Web site Online Focus Group - Test Login Instructions

Performing a successful test login is a requirement for focus group participation. It ensures that you are able to access the online facility, registers your user ID and password, and allows you to bookmark the site for easier access at the time of your scheduled focus group.

Before doing your test login, please make sure of the following:

You are using the computer you plan to use as a focus group participant
Your web browser is an updated version (at least 3.0 for Netscape or MS Internet Explorer) (To check this, click "help" and then "about")
Your screen size is 800x600 or larger (**not** 640x480). (Confirm this in Windows 95 by clicking on start/settings/control panel/display/settings/desktop area)
You have pen and paper to copy down your login ID and password.

With your web browser, **navigate to the following address**:

<URL>

When the site finishes loading, **bookmark** this address and read the information.

Click on the **Test Login prompt** and **follow the instructions**. The simple procedure consists of the following steps:

Create your login ID and password (please write these down)
Select your default protocol
Login to the Focus Group Center and confirm its operation

Test your ability to be "heard" in the room (type a brief message)
Send an email to **[Email Address]** providing your login ID

If your test login should fail, please send an email to **[Contact Person] [Email Address]**, notifying her of the failure.

The most common reason for a test login failure is interference by a company firewall. Company firewalls are designed to prevent tampering by outside computers, but they often interfere with certain operations by computers inside them. If this is the case, you will likely be able to create your account and login but will not have access to the online conferencing function. If this is the case, simply exit your web browser and let **[Contact Person]** know (via email) that you are not able to participate.

On the day of the online focus group (DATE), please login to the **<URL>** site approximately 10 minutes before the group is scheduled to begin (the group will begin at XX:XX pm EST, so you should be logged into the site no later than XX:XX pm EST).

If you have any further questions about the test login or online focus group, please notify **[Contact Person]** by email **[Email Address]** or telephone **[Phone Number]**.

Thank you!

Attachment C—Reminder Email

Reminder Email
To Be Sent Day Before/Day of Online Focus Group

We would like to thank you for agreeing to participate in the online focus group regarding the [institute or agency name] Web site. This is a reminder that the online focus group is scheduled for **DATE,** from **TIME to TIME**.

If you have not already done so, please reaffirm your intention to participate in the online focus group by performing a test login (instructions given below) between the dates of **XX/XX and XX/XX**. If you do not successfully complete the test login between those two dates, you will not be able to participate in the online focus group. If you have questions about the test login instructions or experience any difficulties, please feel free to contact **[Contact Person]** by email **[Email Address]** or by telephone **[Phone Number]**.

If your schedule does not allow your participation in the group, please email **[Contact Person] [Email Address]** and state that you will not be participating.

[institute or agency name] Web site Online Focus Group - Test Login Instructions

Performing a successful test login is a requirement for focus group participation. It ensures that you are able to access the online facility, registers your user ID and password, and allows you to bookmark the site for easier access at the time of your scheduled focus group.

Before doing your test login, please make sure of the following:

You are using the computer you plan to use as a focus group participant
Your web browser is an updated version (at least 3.0 for Netscape or MS Internet Explorer) (To check this, click "help" and then "about")
Your screen size is 800x600 or larger (**not** 640x480). (Confirm this in Windows 95 by clicking on start/settings/control panel/display/settings/desktop area)
You have pen and paper to copy down your login ID and password.

With your web browser, **navigate to the following address**:

<URL>

When the site finishes loading, **bookmark** this address and read the information.

Click on the **Test Login prompt** and **follow the instructions**. The simple procedure consists of the following steps:

Create your login ID and password (please write these down)
Select your default protocol
Login to the Focus Group Center and confirm its operation
Test your ability to be "heard" in the room (type a brief message)
Send an email to **[Email Address]** providing your login ID

If your test login should fail, please send an email to **[Contact Person] [Email Address]**, notifying her of the failure.

The most common reason for a test login failure is interference by a company firewall. Company firewalls are designed to prevent tampering by outside computers, but they often interfere with certain operations by computers inside them. If this is the case, you will likely be able to create your account and login but will not have access to the online conferencing function. If this is the case, simply exit your web browser and let **[Contact Person]** know (via email) that you are not able to participate.

On the day of the online focus group (DATE), please login to the **<URL>** site approximately 10 minutes before the group is scheduled to begin (the group will begin at XX:XX pm EST, so you should be logged into the site no later than XX:XX pm EST).

If you have any further questions about the test login or online focus group, please notify **[Contact Person]** by email **[Email Address]** or telephone **[Phone Number]**.

We look forward to "seeing" you in the group tomorrow night!

Attachment D

CUSTOMER SATISFACTION OF THE [institute or agency name] WEB SITE

MODERATOR'S GUIDE

Online Focus Groups

1. INTRODUCTIONS

Pre_meeting.html
Moderator.html
Protocol.html
Introductions.html
Typeahead.html

a. Introduction of Moderator and Participants

b. "Ground Rules"

1. You have all been asked to participate in this group to offer your views and opinions about the [institute or agency] Web site. The group is at its best when each person contributes answers to the questions posed—so please participate. Think of this as "your" group, and the usefulness of the information gathered here relies on your active participation.

2. All of your answers will be confidential, so feel free to "speak" your mind. We have asked you to use only your first name and first initial of your last name as your User I.D. While a final report of the findings of this group will be produced, no individual names will be identified in that report. Responses will be aggregated as group answers. Please keep in mind that confidentiality is a shared responsibility of the entire group, so please respect others' confidentiality as you would like yours respected.

3. Chat rooms and online focus groups rely on the use of certain rules and etiquette to keep information flowing. Please utilize these rules when you "speak" (type). The rules will be listed on the top portion of your screen.

4. As a part of the research, a complete transcript of this discussion is being made. You need not worry about typing accuracy, spelling mistakes, and proper punctuation. The transcript will be edited to

"clean it up" as needed. Don't allow your concerns about typing issues to slow down your ideas.

5. There are no right or wrong answers to any of the questions being asked today. The goal is to learn as much as possible about your impressions of the [institute or agency name] Web site and its utility. Feel free to discuss those things that you find helpful and useful as well as areas for improvement.

6. It's OK to be critical. If you dislike something or if you have ideas for possible changes, please share them with the group. Your idea may spark other ideas from group members, so don't keep your thoughts to yourself.

2. BRIEF EXPLANATION OF THE FOCUS GROUP PURPOSE / INTRODUCTION OF THE TOPIC

Topic.html

Today we are going to be talking about what electronic and Web-based resources you have at your disposal for getting up-to-date information about health, and how these sources of health information could be improved upon. Ideas and suggestions will inform changes and improvements to the [institute or agency name] Web site.

3. [institute or agency] site

Q01.html

a. How did you first learn about the [institute or agency name] Web site?

   I. At what stage in your situation did you decide to use the [institute or agency name] Web site?

   ii. How much (or to what extent) do you rely on the [institute or agency name] Web site as a source of health-related information, as opposed to other sources?

   ii. How has the [institute or agency name] Web site been helpful—did it work in getting you what you wanted?

Q02.html

b. What types of health-related information are you usually seeking?

Q03.html

c. What are some reasons you use the [institute or agency name] Web site?

Q04.html

d. When/why would you recommend the [institute or agency name] Web site to friends, family, or others?

Q05.html

e. How have you taken advantage of the [institute or agency name] Web site's search options?

Q06.html

f. What do you prefer about using the [institute or agency name] Web site's search feature to other ways of finding health information?

Q07.html

g. In terms of content and functionality (such as printing, downloading files, saving files, etc.), what shortcomings does the [institute or agency name] Web site have as a source of health information? How could the [institute or agency name] Web site be improved?

   I. How can these shortcomings best be addressed? What would the value of (suggestion) be to you?

   ii. What specific features of the [institute or agency name] Web site appeal to you, what features do not?

4. Other Electronic/Web-based Sources of Health-related Information

Q08.html

a. What are the other electronic or web-based resources you might use when you need health related information?

Q09.html

b. What features characterize the variety of health-related resources you just described?

   I. What makes one source better than another?

   ii. How do the [institute or agency name] Web site's search results compare to other sources of health information, in terms of ease of use and satisfaction with search results?

Q10.html

c. How do you decide which resource you will use?

5. CLOSURE / THANK YOU

Q11.html

a. To better understand the value of the [institute or agency name] Web site, and ways of improving it, are there any questions that we should have asked that we didn't?

Q12.html

b. How appropriate were our questions for eliciting information from users of the [institute or agency name] Web site?

6. Follow Up Information (mini-questionnaire)

Survey.htm

Did you feel you knew enough about the [institute or agency name] Web site to contribute to this discussion as you would like?

What was the most difficult part of this process for you?

How could the online focus group process be improved?

What do you feel are the advantages of online focus groups?

What do you feel are the disadvantages of online focus groups?

Would you be interested in continuing to provide feedback to the [institute or agency] about its products?

1) Yes
2) No

Please confirm that you want to receive the $40 honorarium?

3) Yes
4) No

In order that we may mail your honorarium, please provide your name and mailing address:

Name:
Address:

City, State, Country, Zip Code:

THANK YOU ALL and **GOODBYE.**

Attachment E

[institute or agency name] Customer Satisfaction Focus Group Participant Survey

Did you feel you knew enough about [institute or agency name] to contribute to this discussion as you would like?

Yes
No

What was the most difficult part of this process for you?

How could the online focus group process be improved?

What do you feel are the advantages of online focus groups?

What do you feel are the disadvantages of online focus groups?

Would you be interested in continuing to provide feedback to the [institute or agency] about its products?

Yes
No

Do you wish to receive the $40 honoraria?

Yes
No

In order that we may mail your honoraria, please provide your name and mailing address:

Name:
Address:
City:
State:
Country:
Zip Code:
Phone:

Thanks for your comments and for participating in this focus group.

Thank you for taking the time to complete this survey. Select Submit Survey now to send your responses to us.

This questionnaire was created by Perseus Survey Solutions for the Web.

APPENDIX A-8. CUSTOMER SATISFACTION SURVEY

INSTRUCTIONS

The [institute or agency name] is conducting this survey of Web site users to determine their satisfaction with the Web site and its contents. The [institute or agency name] wants to learn about the types of health-related information you need, where you usually obtain that information, how useful the information is to you, and your suggestions for improving this Web site.

Your participation is voluntary. Your opinions are important in helping the [institute or agency name] decide about improvements to the Web site.

1. When you have accessed the [institute or agency name] Web site, what information have you been looking for?
   CHECK UP TO THREE

   1. General information about the [institute or agency name]
   2. [institute or agency name] News and Events
   3. Information about health
   4. Information about clinical trials
   5. Funding opportunities
   6. Scientific resources
   7. Access to [institute or agency name] Institutes/Offices/Divisions/Centers
   8. Information for [institute or agency name] employees
   9. Other (please specify):

2. Which of the following best describes you?
   CHECK ONLY ONE

   1. Member of the general public seeking health-related information
   2. Member of the general public touched by disease
   3. Medical professional (doctor, nurse, or other health care provider)
   4. Scientist/researcher
   5. Medical librarian
   6. [institute or agency name] employee or contractor
   7. Other (please specify):

3. How did you learn about the [institute or agency name] Web site?
   CIRCLE ALL THAT APPLY

   1. Internet search engine (such as Yahoo!, HotBot, AOL)
   2. Link from another Web site
   3. Advertisement
   4. Medical professional informed me
   5. Friend/family member informed me

6. Librarian
7. Other (please specify):

4. How often have you accessed the [institute or agency name] Web site over the past 12 months?
CHECK ONLY ONE

1. Daily {skip to question #6}
2. Weekly {skip to question #6}
3. Monthly {skip to question #6}
4. Once every 3 months
5. Once every 6 months
6. Once a year
7. This is the first time I've accessed the Web site

5. Please indicate why you haven't used the [institute or agency name] Web site more frequently.
CHECK UP TO THREE

1. I haven't needed health-related information very often
2. I don't always have access to the appropriate equipment (e.g., computer, monitor, modem)
3. I need help to get to the Web site
4. I need help to locate the information I need on the Web site
5. I prefer to have a librarian, staff member, or family member gather information for me
6. I prefer to use a search service to gather information for me
7. I have had problems accessing the [institute or agency name] Web site when I have attempted to use it
8. The [institute or agency name] Web site is not easy to use
9. I have not been able to find the information I needed when I used the [institute or agency name] Web site
10. I was not satisfied with the information I received when I used the [institute or agency name] Web site

6. Is there any information that you need, but have not found on the [institute or agency name] Web site?
CHECK ONE RESPONSE

1. No
2. Other (please specify):

7. For each of the following statements, please write how strongly you agree or disagree, using the following five-point scale.

Strongly Agree	**1**
Agree	**2**
Neither Agree Nor Disagree	**3**
Disagree	**4**
Strongly Disagree	**5**

a) ___ The [institute or agency name] Web site is easy to access.

b) ___ The [institute or agency name] Web site is easy to navigate.

c) ___ The search function of the Web site is easy to use.

d) ___ The search function of the Web site has provided me with the information I was seeking.

e) ___ The Web site contains the information I need.

f) ___ The information I received on the Web site was easily understandable.

g) ___ The information I received on the Web site was accurate and useful.

h) ___ The information contained on the [institute or agency name] Web site is timely and up-to-date.

i) ___ The [institute or agency name] Web site provides one-stop access to a variety of health-related resources.

8. Overall, what features of the [institute or agency name] Web site do you value the most?
CHECK UP TO THREE

1. Documents that are visually enhanced with bold headings, improved typeface, etc.
2. Documents that include illustrations to help explain the text
3. Overall organization of the site
4. Information organized by user needs as a patient, health professional, or basic researcher
5. Ability to search for information
6. Links to health-related, federal government Web sites
7. Links to health-related, non-governmental Web sites
8. Glossary of medical terms for patients that includes pronunciations of the words
9. Other, please specify:

9. What recommendations do you have that would make you more satisfied with the [institute or agency name] Web site?
CHECK ALL THAT APPLY

1. Make the [institute or agency name] Web site easier to access
2. Improve the quality of information
3. Make the information more up-to-date information
4. Provide more information that meets my needs (please specify: _____)
5. Provide more assistance for accessing and navigating the Web site
6. Other, please specify:

10. How much do you rely on the [institute or agency name] Web site as a source of health-related information, as compared to other web-based health sources?
CHECK ONLY ONE

1. I rely solely on the [institute or agency name] Web site
2. I rely heavily on the [institute or agency name] Web site
3. I rely moderately on the [institute or agency name] Web site
4. I rely very little on the [institute or agency name] Web site
5. I do not rely at all on the [institute or agency name] Web site

11. In the past 12 months, have you accessed another Web site for health-related information?
CHECK ONE RESPONSE

1. No {skip to question 13}
2. Yes, (please specify the Web site you have accessed most frequently):

12. Think about your experience using the Web site that you specified in question #11 when searching for health-related information. Using the following 5-point scale, please rate how the [institute or agency name] Web site compares to the Web site specified in question #11. If you don't have an opinion, you can write 6 meaning "I don't know enough to answer."

The [institute or agency name] Web site is superior	**1**
The [institute or agency name] Web site is somewhat better	**2**
The [institute or agency name] Web site is about the same	**3**
The [institute or agency name] Web site is somewhat worse	**4**
The [institute or agency name] Web site is inferior	**5**
Don't have an opinion	**6**

a) ___Ease of accessing the Web site
b) ___Ease of navigating the Web site
c) ___Ease of searching for information on the Web site
d) ___Usefulness of information obtained
e) ___Accuracy of information obtained
f) ___Timeliness of information obtained
g) ___Relevance of information obtained

13. Which of the following services would you be most interested in if they were available?
CHECK UP TO THREE

1. Ability to discuss issues on-line with experts on a health-related subject
2. Ability to order full-text documents for citations electronically
3. Ability to contact a service which would conduct a personalized search of all of [institute or agency name]'s information sources for me
4. Automatic delivery via email of news from the [institute or agency name]
5. On-line educational programs
6. Training sessions to teach me how to use [institute or agency name]'s information sources
7. Other (please specify):

14. If you have any additional suggestions about how the [institute or agency name] could improve its Web site to make it more useful to you, please provide in your ideas in the space below.
PLEASE DISCUSS IN THE SPACE BELOW

15. Is there anything else you would like to tell us about the [institute or agency name] Web site?
PLEASE DISCUSS IN THE SPACE BELOW

THANK YOU!

THE [institute or agency] **APPRECIATES YOUR ASSISTANCE IN DETERMINING YOUR SATISFACTION WITH ITS WEB SITE AND HOW TO SERVE YOU BETTER.**

APPENDIX A-9. IMPLEMENTATION DETAILS OF WEB SITE EVALUATION METHODOLOGIES

Methodology	Sample Selection	Data Collection	Data Analysis
Investigative			
Document analysis	Sampling frame (all available records and documents) is probably unknown. If documents are sparse, the sample would include all available.	Requires systematic and creative research, where the initial contacts and documents should lead to otheres.	Read for content and summarize as needed.
Literature and Web site reviews (see also Appendix A-1)	Opportunistic sample based on what seems most similar and appropriate.	Begin with known citations (e.g., see Appendix A-2). Search Web for published reports; investigate information that may be available within NIH user groups (e.g., Web authoring group).	Read for content and summarize as needed.
Site mapping	Map entire site if possible.	Access to Web server is required. Use commercial off-the-shelf software.	Analysis and reporting tools are provided with mapping software; results can be presented in several customizable formats.
Webmaster and staff questionnaire (see also Appendix A-2)	Identify potential respondents in document analysis and through Web master.	Access to Web server is required. Use commercial off-the-shelf software.	Data are captured by software; quantitative responses tabulated, means, etc. calculated. May be graphed. Text responses also captured for review.
Expert critique/expert panel (see also Appendix A-3)	Three to four experts or usability professionals identified from among members of the professional community.	Each expert independently reviews the Web site, using a standard set of heuristics.	Each expert submits a written report and then group is convened to discuss the site and produce a single final report.

Methodology	Sample Selection	Data Collection	Data Analysis
User-centered			
Usability tests (see also Appendix A-4 and A-5)	Sampling frame includes members of the public interested in a healthy lifestyle; members of the public touched by disease; and those individuals who are accessibility challenged. Recruit four to six from each group.	All but accessibility challenged perform usability tests in laboratory. Accessibility challenged participants can be tested in the field using portable lab facilities to take advantage of their assistive technology. Each subject performs pre-designed task	Compile and categorize usability problems observed on the basis of effect on performance and frequency; review videotaped sessions. Methods, results and design recommendations are included in final, written report.
Transaction log analysis	Select a time period of one month or more.	Files provided by NIH Webmaster or other staff. Analysis and reporting are performed in real-time or on demand, on the log file itself.	Software provides analysis and reporting tools. Results are stored in a database, and reports can be created in word processing or spreadsheet format, text or comma delimited formats, or can be created in HTML format and made available to online.

Methodology	Sample Selection	Data Collection	Data Analysis
Email content analysis (see also Appendix A-6)	Sample from user requests for information and/or user comments about the Web site. Number may depend partly on size of sampling frame. Other types of email (e.g., Web master or staff responses to user emails) may be included if readily available and ident	Emails provided by NIH staff. Prefer distinct groups of comments and requests, but single emails may contain both or multipes of either. When this happens, individual elements of the emails are coded separately.	A randomly selected subset of each type of email is reviewed and coded. Once an inductively-developed coding system is established and coding reliability determined, it is applied to the entire sample. Report summarizes emails along one or more dimensions
Customer satisfaction focus groups (see also Appendix A-7)	Recruited from among defined user subpopulations of interest. Prescreen for preselected demographic and other characteristics. Oversample to compensate for "no shows."	For online focus group, must ensure ahead of time that participants can log in. Group moderator uses discussion guide. Software automatically records transcript of session.	Written report summarizing, categorizing, and interpreting qualitative data. Full transcripts may be included.
Customer satisfaction questionnaires (see also Appendix A-8)	Sample selection depends partly on where the Web-based questionnaire is served (e.g., NIH home page, consumer health information site, etc.). Regardless, the sample will be self-selected, but demographic information may be obtained to characterize respond	Web-based survey served from a location on the NIH Web site to be determined. Questionnaire will be approved by the Task Leader and will include questions on many of the issues explored in the customer satisfaction focus groups. OMB clearance required.	Data will be stored in database records for analysis. Closed-ended questions will be tabulated and summarized by category of respondent. Open-ended questions will be coded and categorized.

APPENDIX A-10. PERFORMANCE MEASURES AND WEB SITE EVALUATION METHODOLOGIES

	Performance Measures			
Methodology	**Extensiveness**	**Customer Service**	**Effectiveness**	**Impact**
Investigative (Informing the evaluation but not necessarily contributing directly to performance measurement)				
Document analysis	Analysis of documents that pertain to the conceptualization and purpose of the Web site may help identify and define the intended audience.		Identification of individuals responsible for content development, Web site design, or other activities, who should be interviewed or surveyed. Identification of purpose of Web site.	
Literature and Web site reviews			Background information on standard Web site metrics and methodologies; identification of other Web sites that are in similar "markets."	
Site mapping	Overview as well as detail about Web site content and organization.			
Webmaster and staff questionnaire	From the perspective of the agency or Institute--what services are provided and how are resources being used?	Collect information on level of effort, hardware, software, efforts to assess accessibility and/or usability, and how content is managed.	Collect information on Web page content responsibility and effort, accessibility standards used, META tag use and type, whether content was originally developed in another medium.	

	Performance Measures			
Methodology	**Extensiveness**	**Customer Service**	**Effectiveness**	**Impact**
Expert critique/expert panel		Assessment of usability of content.	Is the site usable (e.g., clarity of writing, navigation, intuitiveness) and accessible so that objectives can be met?	Heuristic review of site provides information on usability and accessibility that may interfere with benefit to users.

Methodology	Performance Measures: Extensiveness	Customer Service	Effectiveness	Impact
User-centered (information from and about users)				
Usability tests		Probable incidence of problems using site; user satisfaction.	Is the Web site fulfilling its mission by meeting user expectations? Is it available to accessibility-challenged users?	
Transaction log analysis	Who is visiting the site (by domain)? What are they accessing? How many bytes transferred?	Responsiveness of Web server to user requests; errors returned; use of search engine.	Information on most-downloaded files and file types.	
Email content analysis	Some indication of users reached, but biased by self-selection of those willing to send email.	Recurring requests and comments may indicate areas for improvement.	Level and type of comments, requests, criticisms.	Anecdotal evidence may be found in user comments.
Customer satisfaction focus groups		User satisfaction with content and design. Comparison of NIH and other health information sites.	Are users finding what they are looking for? How does the NIH Web site compare to other health information sites?	Benefit of information and services. Effect on attitudes or behavior. Comparison to other sources of health information.
Customer satisfaction questionnaires	Some indication of users reached, but biased by self-selection of those willing to respond to survey.	User satisfaction with content and design. Indication of valuable new services. Use of NIH and other health information sites.	Are users finding what they are looking for? How does the NIH Web site compare to other health information sites?	Satisfaction and personal benefit. Effect on attitudes and behavior.

Extensiveness: extent of services provided and users reached
Customer Service: responsiveness, provision of useful content
Effectiveness: meeting mission and objectives of Web site
Impact: benefit of the service to the user