

# **Center for Cancer Training (CCT)**

## **Website Evaluation**

### **Final Report**

Prepared by NOVA Research Company

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## EXECUTIVE SUMMARY

The Center for Cancer Training (CCT) is a component of the National Cancer Institute's Office of the Director (NCI/OD). CCT maintains a website at <http://www.cancer.gov/cct>. From December 2012 through March 2014, NOVA Research Company conducted an evaluation of the website for the purpose of determining the site's effectiveness and usability. The evaluation included a web traffic analysis, a competitive analysis, a heuristic assessment, and usability testing.

### Web Traffic Analysis

NOVA reviewed and analyzed CCT Omniture Web traffic reports for January 2011 through November 2012 in order to gain a better understanding of how visitors are accessing and using the CCT website. A total of 116,439 visits were reported during this time period; the majority (73%) were unique visitors.

Traffic volume varied across the 23 months included in the traffic reports. Visits peaked in January 2012 and were lowest in January 2011. Further study is needed to understand causes of traffic volume patterns for the CCT site.

More than 75 percent of visitors who followed links from other websites to the CCT site were referred from federal government websites.

Directed searches related to cancer training using Google and Bing return the CCT site in the top two search results for many common search terms, indicating that people looking for information about CCT and/or cancer training opportunities should be able to find the CCT website using a search engine.

### Competitive Analysis

While evaluating the usability and effectiveness of the CCT website, NOVA reviewed training pages from four other federal websites: the National Institute of Allergy and Infectious Diseases (NIAID), the National Center for Complementary and Alternative Medicine (NCCAM), the NIH Office of Intramural Training and Education (OITE), and the National Science Foundation (NSF). CCT was compared with the other sites in terms of compliance with NCI Web Standards and Policies and the Requirements and Best Practices Checklist for Government Web Managers, thus identifying CCT strengths and weaknesses. In addition, the competitive analysis identified innovations on other sites that might serve as a model for CCT to improve website performance and content quality.

The CCT website compares well with other reviewed websites in terms of best practices and visual appeal. However, the site compares less favorably in the areas of content management, search function, interactivity, and formatting of data in tables and lists.

### Heuristic Assessment

A heuristic assessment was conducted to confirm CCT website compliance with NCI Web Standards and Policies, federal guidelines, and evidence-based best practices. The site was assessed using the Requirements and Best Practices Checklist for Government Web Managers and a comprehensive 25-point checklist from Forrester Research.

CCT met 88 percent of the NCI requirements and policies, including a perfect score on visual standards and near-perfect scores on navigation links and on required and recommended content elements.

On the Government Web Managers scorecard, CCT scored 37 points below passing. The site at least partially met all of the requirements and recommendations, and scored acceptably on Collaboration/Avoiding Duplication and Federal Laws, Regulations, and Other Directives and within 1 point of passing on Usability, Accessibility, and Design. Improvement is needed on other areas, such as site planning and maintenance.

The CCT website missed a passing score on the Forrester checklist by 3 points. The CCT site excelled in the areas of Presentation and Trust, but improvement is needed in Value and Navigation.

Bringing the website into compliance with best practices, guidelines, and requirements included in the assessment can be accomplished fairly easily, in most cases with minimal support from NCI information technology/web staff.

## **Usability Testing**

NOVA conducted two rounds of usability testing of the CCT website (June 2013 and January 2014). Twenty-four individuals participated in 1-hour test sessions. Testers fell into the following categories: past, current, and prospective training grantees, trainees, and interns; researchers/training program managers (hereafter referred to as researchers); and grant administrators. During each session, test participants performed real-world tasks using the website while thinking aloud, completed a satisfaction assessment, and answered questions about their overall impressions of how the website looked and worked.

NOVA recommended changes intended to address specific issues that had been identified during Round 1 testing. After CCT implemented some (but not all) of these recommended changes, NOVA conducted a second testing round to detect whether these changes resulted in improved user satisfaction and website performance.

A comparison of Round 1 and Round 2 satisfaction and performance scores indicates that website changes produced mixed results. User satisfaction increased slightly overall, with higher average satisfaction scores reported by all participant groups except researchers (-10 points). In terms of performance, completion rates improved an average of 2 percentage points, but overall error-free rates worsened by 3 percentage points. Overall, average time on task (TOT) was reduced by 6 seconds. Some improvement was noted as a result of specific changes made to the website after Round 1 testing. Based on these results, it appears that changes made to the site were not sufficient to improve user satisfaction and performance in a meaningful way.

## **Final Recommendations**

CCT website strengths and weaknesses were identified throughout the course of the evaluation. Combined findings from the competitive analysis, heuristic assessment, and usability testing components of the evaluation highlight areas in which the website excels and where improvement is needed. Final recommendations for site improvements include methods for increasing content readability, creation of standard operating procedures (SOPs) for site maintenance, and optimization of the search function.

CCT staff are encouraged to review and prioritize the recommendations according to severity of the identified issue and availability of resources. Where changes require more resources than are feasible, CCT might consider establishing an SOP that complies with specific guidelines and applying it to all new content. For example, to improve readability of site content, use the MS Word readability statistics function to test all new text and revise it as needed to meet target reading ease and grade level scores before posting it to the site.

## INTRODUCTION

The Center for Cancer Training, a component of the National Cancer Institute's Office of the Director, maintains a website at <http://www.cancer.gov/cct>. From December 2012 through March 2014, NOVA Research Company conducted an evaluation of the website for the purpose of determining the site's effectiveness and usability. The evaluation included the following components:

- Web traffic analysis
- Competitive analysis
- Heuristic assessment
- Usability testing.

## WEB TRAFFIC ANALYSIS

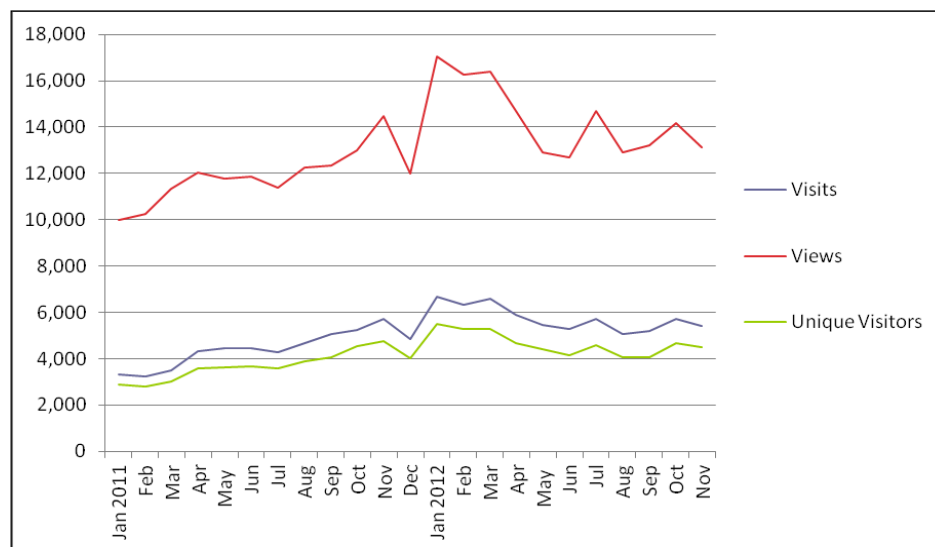
To improve understanding of how visitors are accessing and using the CCT website, NOVA reviewed the available CCT Omniture Web traffic reports, which covered January 2011 through November 2012. This section of the report summarizes aspects of the web traffic data, including which pages visitors viewed the most and least, how visitors arrived at the CCT site (e.g., referrals from other websites or search engine results), and general traffic patterns. The complete Web Traffic Analysis Report is provided as Appendix A.

During the 23 months covered by the Omniture reports, the CCT site averaged 5,063 visits per month, for a total of 116,439 visits. The majority (73%) were unique visitors.

### Changes in Traffic Volume

Traffic volume (i.e., total page views) during the reported period varied across months (Figure 1). The numbers of visits and unique visitors tracked each other very closely and loosely followed the same pattern as for page views. The majority of visitors were unique, suggesting that they found the necessary information in one visit to the CCT site, followed a link to another source, or did not find the site content useful.

**Figure 1. Page Views by Month**



During 2012, peaks occurred in January (17,041 visits), March (16,411), February (16,273), and July (14,674). CCT staff reported recurring activities that might explain the first three peaks; however, a comparison of 2011 and 2012 traffic volume showed no correlation between increased traffic volume and these events. Further study is needed to identify causes of change in CCT website traffic volume.

## Most-Viewed Pages

The CCT site encompasses six main sections: Center for Cancer Training (hereafter referred to as CCT Homepage), Cancer Training at NCI, Funding for Cancer Training, Other Fellowships and Internships, About the Center for Cancer Training, and Contact Information (Figure 2).

The most-viewed page on the CCT website was the Cancer Training at NCI/programs page ([www.cancer.gov/researchandfunding/cancertraining/atnci/programs](http://www.cancer.gov/researchandfunding/cancertraining/atnci/programs)). In March 2011, the content of this page was combined with the content of two other pages: the summer programs page<sup>1</sup> and Cancer Training at NCI ([www.cancer.gov/researchandfunding/cancertraining/atnci](http://www.cancer.gov/researchandfunding/cancertraining/atnci)),<sup>2</sup> the third most commonly viewed page. After combining the content of the three pages and expunging the old pages, the expanded Cancer Training at NCI page (Figure 3) was the most-viewed page from June through November 2012.<sup>3</sup>

**Figure 2. CCT Website Menu**

Center for Cancer Training
► Cancer Training at NCI
► Funding for Cancer Training
► Other Fellowships and Internships
► About the Center for Cancer Training
► Contact Information

**Figure 3. Most-Viewed CCT Page: Cancer Training at NCI**

The screenshot shows the National Cancer Institute website. The main header includes the NCI logo and navigation links. The page title is 'The Center for Cancer Training'. The main content area is titled 'Cancer Training at NCI (Maryland)' and includes a description of the training opportunities. A table titled 'Training in Cancer Research at NCI' lists various programs and their details.

Program Name	Discipline	Career Stage
Center for Cancer Research (CCR) Fellowships	<ul style="list-style-type: none"> <li>Basic science</li> <li>Translational research</li> <li>Clinical research</li> <li>AIDS research</li> </ul>	<ul style="list-style-type: none"> <li>Postdoctoral and clinical fellows</li> <li>Graduate, medical, and dental students</li> <li>Postbaccalaureates</li> <li>High school students</li> </ul>
Cancer Prevention Fellowship Program (CPFP)	<ul style="list-style-type: none"> <li>Cancer prevention, control, and population sciences</li> </ul>	<ul style="list-style-type: none"> <li>Postdoctoral and clinical fellows</li> </ul>

The CCT Homepage ([www.cancer.gov/researchandfunding/cancertraining](http://www.cancer.gov/researchandfunding/cancertraining)) was the second most commonly viewed page, followed by the Cancer Training at NCI page. Table 1 provides a breakdown of the most-viewed pages within CCT.

<sup>1</sup> This page had 3,779 visitors between January 2011 and November 2012 and was the 20<sup>th</sup> most-viewed page.

<sup>2</sup> This page had 25,498 views between January 2011 and November 2012.

<sup>3</sup> Between March 2011 and June 2012, the summer programs page and the old version of the Cancer Training at NCI page erroneously continued to exist until their discovery and deletion in June 2012.

**Table 1. Most-Viewed Pages by Number of Views, January 2011–November 2012**

Rank	Webpage	Total Page Views
1*	Cancer Training at NCI/Programs	35,207
2	CCT Homepage	31,222
3	Cancer Training at NCI	25,498
4	Funding for Cancer Training	17,213
5	The Pathway to Independence Award (K99/R00)	14,604
6	Other Fellowships and Internships	12,115
7	Ruth L. Kirschstein NRSA Institutional Research Training Grant (T32)	11,366
8	Funding Opportunities for Training by Award Type	8,318
9	Ruth L. Kirschstein NRSA for Individual Predoctoral Fellows (F31)	7,304
10	Ruth L. Kirschstein NRSA for Individual Postdoctoral Fellows (F32)	5,883

\*Page no longer available at address included in Omniture report; content has been moved.

### Least-Viewed Pages

Each of the nine least-viewed pages (Table 2) had only one view between January 2011 and November 2012. Most (88%) of these pages are in the Funding for Cancer Training section.

**Table 2. Least-Viewed Pages, January 2011–November 2012**

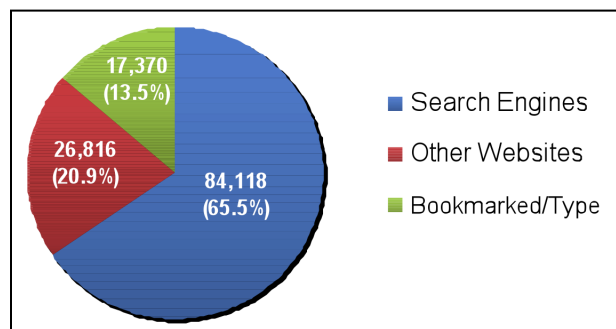
Webpage
<a href="http://www.cancer.gov/researchandfunding/cancertraining/f32/peerreview">www.cancer.gov/researchandfunding/cancertraining/f32/peerreview</a>
<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/f31/">www.cancer.gov/researchandfunding/cancertraining/outsidenci/f31/</a>
<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/k05/allpages">www.cancer.gov/researchandfunding/cancertraining/outsidenci/k05/allpages</a>
<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/k08">www.cancer.gov/researchandfunding/cancertraining/outsidenci/k08</a> - Page 1
<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/k08/allpages">www.cancer.gov/researchandfunding/cancertraining/outsidenci/k08/allpages</a>
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<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/k23/">www.cancer.gov/researchandfunding/cancertraining/outsidenci/k23/</a>
<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/k25">www.cancer.gov/researchandfunding/cancertraining/outsidenci/k25</a> - Page 1
<a href="http://www.cancer.gov/researchandfunding/cancertraining/outsidenci/t32">www.cancer.gov/researchandfunding/cancertraining/outsidenci/t32</a> - Page 1

\*Print pages (i.e., page views created for printing a hard copy) were excluded from this list.

### Referrers: Finding the CCT Site

The majority of visitors reached the CCT website via links from search engine results (65.5%) or from other websites (20.9%). A smaller percentage (13.5%) of visitors keyed in the site address or used a bookmark. A negligible number (210, 0.2%) arrived from social networks (not shown in Figure 4).

**Figure 4. Number and Percent of Visits by Referrer Type**



More than three-fourths of those who came to the CCT site from other websites were following links from federal government sites: the National Institutes of Health (NIH, 49%), NCI (cancer.gov, 26.7%), and NCI Frederick National Laboratory for Cancer Research (3.9%). The next highest referrer was the University of North Carolina at Chapel Hill (1.6%).

### **What keywords did visitors use to find the CCT site?**

The Omniture report lists keywords used in external searches that led visitors to CCT pages. Keywords were unavailable for nearly one-fourth of searches (i.e., Google- encrypted searches that cannot be captured by Omniture). Table 3 lists the top ten known keywords used.

To augment Omniture report data on keyword searches, NOVA conducted a limited keyword search using Google and Bing (the two search engines that accounted for 82.5% of market share in 2012) to see whether CCT pages appeared among the top search results. Reported ranks disregard ads, scholarly articles, images, and "News about..." boxes.

### **All tested search terms achieved top search results.**

For 14 out of 15 search terms, the CCT website was either the first or second result in both Google and Bing. This indicates that individuals looking for information on cancer training opportunities and other topics covered by the CCT website should be able to find the website easily using a search engine.

The CCT Homepage was the first result in both Bing and Google searches for the following terms: NCI Center for Cancer Training, Center for Cancer Training, National Cancer Institute Center for Cancer Training, cancer training opportunities, cancer training grant, NCI training grant, and National Cancer Institute training grant. The search terms cancer training fellowship, cancer training internship, NCI fellowship, National Cancer Institute fellowship, NCI internship, and National Cancer Institute internship also produced the most appropriate CCT pages as first results in both search engines. NCI internship was the only search term that did not report CCT as the first or second result (result 14 on Bing, but first result on Google). These results suggest that the CCT site is a key site for information on all NCI training opportunities. Table 4 displays the selected search terms and their respective ranks in search results.

**Table 3. Top Ten External Search Terms**

Search Keywords	Searches
epidemiology internships	960
NCI K99	863
T32	658
NCI fellowship	590
K99	539
NCI K07	535
NCI K22	517
K23	492
National Cancer Institute internship	479
T32 training grant	463

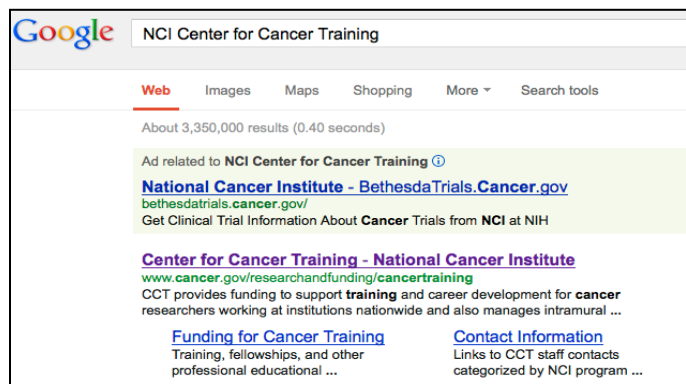


**Table 4. Selected Search Terms by Rank in Search Results**

Search Terms	Rank		CCT Page
	Google	Bing	
NCI Center for Cancer Training	1	1	CCT Homepage
Center for Cancer Training	1	1	CCT Homepage
National Cancer Institute Center for Cancer Training	1	1	CCT Homepage
Cancer training opportunities	1	1	CCT Homepage
Cancer training fellowship	1	1	Google: Cancer Training at NCI Bing: CCT Homepage
Cancer training internship	1	1	Cancer Training at NCI
Cancer training grant	1	1	CCT Homepage
NCI fellowship	1	2	Cancer Training at NCI
National Cancer Institute fellowship	1	2	Cancer Training at NCI
NCI internship	1	14	Cancer Training at NCI
National Cancer Institute internship	1	2	Google: Cancer Training at NCI Bing: Other Fellowships and Internships
NCI training grant	1	1	CCT Homepage
National Cancer Institute Training grant	1	1	CCT Homepage
NCI K award	2	2	Google: K Awards: Transition of CDAs Bing: The NCI Transition Career Award (K22)
National Cancer Institute K award	2	1	Google: K Awards: Transition of CDAs Bing: Mentored Patient-Oriented Research Career Development Award (K23)

Figure 5 depicts Google search results for the NCI Center for Cancer Training.

**Figure 5. Google Search Results: NCI Center for Cancer Training**



## Website Pathways

Most visitors viewed a single page on the CCT website and then exited the site (Table 5). Corresponding precisely with the top-viewed pages, most visitors started at the Cancer Training at NCI/programs page and then exited the site (12,807 visits). The second most common path started at the Ruth L. Kirschstein NRSA Institutional Research Training Grant (T32) page, followed by exit from the site (5,767 visits). This suggests that most visitors followed direct links to the T32 page from other websites rather than browsing the CCT site for the desired information. It also may suggest that visitors found what they wanted right away; however, further study of visitor motivation would be required to confirm this.

**Table 5. Percent Visits by Path**

Rank	Most Common CCT Site Paths	Visits	
		Number	%
1	Entered Site > cancertraining/atnci/programs > Exited Site	12,807	12.6
2	Entered Site > cancertraining/outsidenci/t32 > Exited Site	5,767	5.7
3	Entered Site > cancertraining/outsidenci/k99 > Exited Site	5,702	5.6
4	Entered Site > cancertraining/atnci > Exited Site	5,146	5.1
5	Entered Site > cancertraining > Exited Site	2,664	2.6
6	Entered Site > cancertraining/outsidenci/f32 > Exited Site	2,242	2.2
7	Entered Site > cancertraining/outsidenci/f31 > Exited Site	2,061	2.0
8	Entered Site > cancertraining/outsidenci/k07 > Exited Site	1,996	2.0
9	Entered Site > cancertraining/outsidenci/k22 > Exited Site	1,378	1.4
10	Entered Site > cancertraining/outsidenci/k08 > Exited Site	1,301	1.3

## METHODOLOGY: COMPETITIVE ANALYSIS, HEURISTIC ASSESSMENT, AND USABILITY TESTING

This section of the report summarizes the methodology used to conduct the competitive analysis, heuristic assessment, and usability testing components of the website evaluation.

### Competitive Analysis

How does CCT measure up against websites of federal organizations that offer information about training programs or opportunities similar to those of CCT? NOVA compared CCT's site with the websites of the following organizations: the National Institute of Allergy and Infectious Diseases (NIAID, [www.niaid.nih.gov](http://www.niaid.nih.gov)); the National Center for Complementary and Alternative Medicine (NCCAM, [www.nccam.nih.gov](http://www.nccam.nih.gov)); the NIH Office of Intramural Training and Education (OITE, [www.training.nih.gov](http://www.training.nih.gov)); and the National Science Foundation (NSF, [www.nsf.gov](http://www.nsf.gov)). The analysis focused on how these other leading research sites solve similar challenges as they attempt to fulfill their respective missions.

Sites were evaluated for compliance with NCI Web Standards and Policies as well as the Requirements and Best Practices Checklist for Government Web Managers, a scorecard containing best practices and requirements from WebContent.gov. Comparing the performance of CCT's website with that of these other sites (i.e., how well they followed each standard, policy, and best practice) helped identify CCT's strengths and weaknesses. In addition, the competitive analysis identified innovations on other sites that might serve as a model for CCT to improve website performance and content quality.

CCT site strengths and weaknesses identified during the competitive analysis are summarized in the Findings section of this report. The complete Competitive Analysis Report is provided as Appendix B.

## Heuristic Assessment

NOVA assessed CCT website compliance with (1) NCI Web Standards and Policies; (2) federal guidelines and evidence-based best practices; and (3) site performance standards. Findings of this assessment are summarized in the Results section of this report.

### NCI Web Standards and Policies

NCI's Web Standards and Policies address various legal issues such as endorsement and liability, privacy and security, copyright, compliance with Freedom of Information Act (FOIA) requirements, accessibility, and exit disclaimers. These policies and standards are available at <http://www.cancer.gov/global/web/policies> and <http://www.cancer.gov/global/webresources>, respectively.

### Federal Guidelines and Evidence-Based Practices

The Requirements and Best Practices Checklist for Government Web Managers scorecard is based on a comprehensive assessment checklist developed by the Federal Web Managers Council to measure adherence to federal website requirements and evidence-based best practices such as those published in [Research-Based Web Design & Usability Guidelines](#). The tool encompasses current laws and regulations, Office of Management and Budget (OMB) Policies for Federal Public Websites, and other directives that pertain to federal public websites.

Scores are always a positive or negative number. No zeros are assigned in this measurement. Scorecard questions that refer to policies or practices that are met by NCI or where compliance is achieved exclusively within the NCI footer were not considered. In total, the CCT site was assessed for compliance with 60 primary requirements and recommendations.

The assessment involved examining content on primary pages for adherence to plain language standards published on Howto.gov. Plain language best practices, methods used to determine readability, and target readability scores are described in detail in the full Heuristic Assessment Report (Appendix C).

### Site Performance Standards

The CCT website also was assessed using a comprehensive 25-point checklist developed by Forrester Research. Scores are always a positive or negative number. No zeros are assigned in this measurement.

This scorecard measures site performance in four key areas: Value, Navigation, Presentation, and Trust. Value refers to whether the site provides value to visitors. Navigation questions focus on whether the menu items, navigation buttons/icons, and related functions work well. The Presentation section concerns how well the appearance of the site and its components support visitor success. The Trust section hones in on how well the website's performance earns visitor trust; for example, whether visitors feel confident that they are reaching their intended destination.

Before implementing this assessment, sample goals were developed for the website's target audiences. The following four goals were used:

1. Understand the purpose or mission of the Center for Cancer Training. (What is CCT and what does it do?)
2. Learn basic information about cancer training opportunities at NCI.
3. Learn basic information about cancer training opportunities outside of NCI.
4. Find eligibility criteria, application deadlines, and other requirements for specific cancer training opportunities—or at least a link to sources that provide this information.

## Usability Testing

During June 2013 and January 2014, NOVA conducted usability testing of the CCT website. The second round of usability testing was designed to detect whether changes implemented after Round 1 had improved user satisfaction and website performance. This report section describes the usability testing methodology—from OMB clearance through recruitment and testing—for both rounds.

### OMB Clearance

Due to the number of participants involved, OMB clearance was required for the usability testing activity. NOVA staff drafted recruitment messages, a participant screener, a consent form, and a usability test script. These documents were submitted for OMB clearance via the NIH Fast-Track Process. After minor revisions, the materials received official clearance.

### Recruitment

CCT identified the following groups for usability testing: past and current grantees, trainees, and interns; prospective grantees, trainees, and interns; researchers/training program managers; and grant administrators. The goal was to recruit a total of 12 participants for each test round—four past and current grantees, four prospective grantees, three researchers, and one grant administrator.

To recruit study participants, NOVA sent email invitations to official NIH distribution lists as well as lists compiled by CCT staff from NIH RePORTer; the NIH Electronic Research Administration's Query, View, Report (QVR) module; and the NIH Office of Intramural Training and Education website. The process was repeated to recruit test participants for Round 2; several participants who had responded too late to participate in Round 1 were contacted again and scheduled for Round 2.

All individuals who responded to email invitations were screened via telephone. Those who met target audience criteria were invited to participate and asked to complete and return a consent form. (The telephone screener and consent form are included in the Round 1 Usability Test Report, Appendix D.)

Each nonfederal participant received a \$25 Visa gift card as a token of appreciation. Federal employees were deemed ineligible for the incentive because participation in the usability test is considered a part of their regular employee duties; a note of thanks was sent to each federal participant.

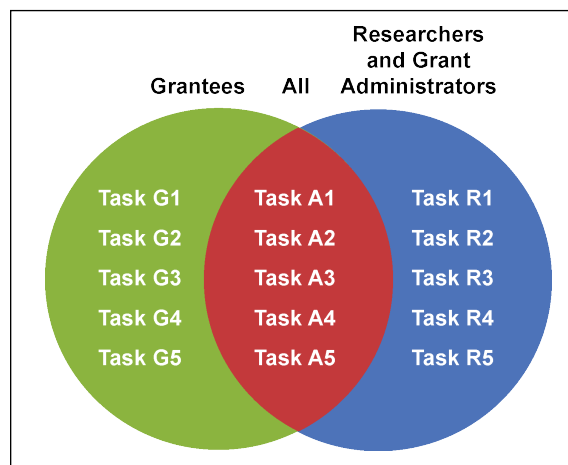
### Testing

A total of 24 individuals participated in 1-hour test sessions: 16 past, current, and prospective training grantees, trainees, and interns; 6 researchers/training program managers; and 2 grant administrators. Testing was conducted on line. Participants accessed a private Adobe Connect session and then “shared” their computer desktops (i.e., allowed the NOVA facilitator to view what they were doing on their computers). Sessions were recorded via Adobe Connect and a digital audio recorder. During the usability test, participants:

- Provided basic information about themselves to confirm that they represented the appropriate target audience
- Described their initial impressions of the CCT website
- Performed real-world tasks using the website while thinking aloud
- Completed a System Usability Scale (SUS)
- Answered questions about their overall impressions of how the website looked and worked.

Each participant completed a total of ten tasks. As shown in Figure 6, all participants completed tasks A1–A5; grantee groups completed an additional five tasks (G1–G5); and the Researchers/Training Program Managers and Grant Administrators completed five additional tasks (R1–R5).

**Figure 6. Test Question Distribution Across Participant Groups**



## Script Revisions

Website changes implemented after Round 1 testing made it necessary to revise the usability test script for Round 2. Two items from the Round 1 script were revised for Round 2 testing:

1. G2: In Round 1, the task was: Find one award for which foreign nationals are eligible. This task required test participants to view multiple awards until they found one that fit the criteria. In Round 2, the question was made more specific: Are foreign nationals eligible to apply for K24 (Midcareer Investigator Award in Patient-Oriented Research) and K99/R00 (Pathway to Independence Award) grants?
2. R3: In Round 1, the question was: Who administers the CCT extramural training programs? In Round 2, the question was revised to eliminate the use of the term extramural. The revised question read as follows: Who administers CCT's training grants, fellowships, and research career development awards?

Test scripts for Rounds 1 and 2 are included in Appendices D and E, respectively.

## Satisfaction Metrics

The System Usability Scale was administered as a measure of satisfaction. Test participants indicated their agreement with each of 10 statements, using a scale from 1 to 5 where 1 equaled strongly disagree and 5 equaled strongly agree. (The SUS is included in the test script in Appendix E.) Statements in the SUS touch on site complexity, consistency, and user-friendliness.

## Performance Metrics

The following performance metrics were collected during the usability tests: task completion, completion rate, time on task, critical errors, non-critical errors, and error-free rate.

**Task Completion.** The task was considered completed when participants indicated they had obtained the data or achieved the goal (whether successfully or unsuccessfully) or when participants indicated they could not complete the task.

**Completion Rate.** The completion rate is the percentage of test participants who successfully complete the task without critical errors. This rate represents the percentage of participants who, when they were finished with the specified task, had an outcome or answer that was correct. A completion rate of 80 percent was the goal for each task in this usability test.

**Time on Task.** Time on Task is the time required to complete a task. It was measured from the time the person began the task to the time he/she signaled completion.

**Critical Errors.** Critical errors are unresolved errors that occur during the process of completing the task or errors that produce an incorrect outcome (answer). Participants may not be aware that the task goal is incorrect or incomplete. Independent completion of the scenario was a universal goal; if help was obtained from the facilitator, the task was scored as a critical error.

**Non-critical Errors.** Non-critical errors are “recoverable” errors such as taking a long or unexpected path to find an answer. Non-critical errors do not have an impact on the final task outcome but do reflect inefficiency. Participants may not detect non-critical errors, but they usually are frustrating to participants.

**Error-Free Rate.** The error-free rate is the percentage of test participants who complete the task without any critical or non-critical errors. An error-free rate of 75 percent was the goal for each task in this usability test.

## RESULTS: COMPETITIVE ANALYSIS, HEURISTIC ASSESSMENT, AND USABILITY TESTING

### Competitive Analysis

The CCT website compares well with other reviewed websites in terms of best practices and visual appeal. However, there is room for improvement in the areas of content management, search function, interactivity, and formatting of data in tables and lists.

#### Best Practices

The CCT website was compared with other sites on the following best practices: content management (including plain language usage and appropriate usage of metatags), file size, search engine performance, and Section 508 compliance. These best practices are based on Department of Health and Human Services specifications as presented in *Research-Based Web Design & Usability Guidelines*.

**Content Management.** CCT compares favorably with other websites in this area. The CCT site refrains from using acronyms and undefined technical terms. In addition, source code for CCT pages includes description and language metatags not found on the OITE and NSF pages. Although CCT is in line with the other sites in terms of reading grade level (a measure of plain language), the site did not fare as well on reading ease. All four of the other sites reviewed scored better than CCT on reading ease.

**File Size.** CCT is in line with other reviewed sites on best practices for file sizes. The average file size of CCT primary pages is 21kilobytes (kb), well below the maximum recommended 50kb. Keeping files small improves download times, which accommodates visitors with low connection speeds.

**Search Engine Performance.** Best practices for search functions include placing the search box in the same position on all pages (usually the upper third of the webpage), producing search results in three seconds or less, and displaying results in an easy-to-read format that shows visitors the terms for which they searched. CCT and all four of the comparable sites comply with these practices.

CCT’s search function does not highlight the search term in the results and does not allow wildcard searches; these functions are available on all four of the other sites. Only NIAID allows visitors to conduct more refined, focused searches to identify the most relevant results by searching within results.



CCT's search engine function is a component of the main NCI website rather than a separate function. This places CCT somewhat at a disadvantage, as search results may lead visitors away from the CCT pages. For example, a search for "high school" points to numerous other NCI website pages (Figure 7); the relevant page on the CCT website that describes training opportunities for high school students is not included in the first ten search results. The OITE site, which is a component of the NIH website, has an independently functioning search feature, as do many other NCI Division, Office, and Center websites.

**Figure 7. CCT Search Results for "High School"**

**Results for: high school**

**Results 1-10 of 2534 for: high school**

[School lunch and snacking patterns among high school students: associations with school food environment and policies. — Measures of the Food Environment](https://riskfactor.cancer.gov/mfe/search-publications/School-lunch-and-snacking-patterns-among-high/?searchterm=None)  
 Skip to content. | Skip to navigation Site Map Accessibility Contact Search Site only in current section  
 Advanced Search... Personal tools Cancer Control and Population Sciences Home Applied Research  
 Risk Factor Monitoring & Methods Measures of the  
<https://riskfactor.cancer.gov/mfe/search-publications/School-lunch-and-snacking-patterns-among-high/?searchterm=None>

[School lunch and snacking patterns among high school students: associations with school food environment and policies. — Measures of the Food Environment](https://riskfactor.cancer.gov/mfe/search-publications/School-lunch-and-snacking-patterns-among-high)  
 Skip to content. | Skip to navigation Site Map Accessibility Contact Search Site only in current section  
 Advanced Search... Personal tools Cancer Control and Population Sciences Home Applied Research  
 Risk Factor Monitoring & Methods Measures of the  
<https://riskfactor.cancer.gov/mfe/search-publications/School-lunch-and-snacking-patterns-among-high>

[Variables affecting high school students' perceptions of school foodservice. — Measures of the Food Environment](https://riskfactor.cancer.gov/mfe/search-publications/Variables-affecting-high-school-students/?searchterm=None)  
 Skip to content. | Skip to navigation Site Map Accessibility Contact Search Site only in current section  
 Advanced Search... Personal tools Cancer Control and Population Sciences Home Applied Research  
 Risk Factor Monitoring & Methods Measures of the  
<https://riskfactor.cancer.gov/mfe/search-publications/Variables-affecting-high-school-students/?searchterm=None>

None of the top 10 search results are CCT web pages.

**Section 508 Compliance.** For the most part, CCT's website complies with the requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d), designed to make online information and services fully available to citizens with disabilities. Compliance errors include missing alternate text on web pages and missing tags within a downloadable PDF. (See the Recommendations section of this report for details.) More severe compliance issues (e.g., nonfunctioning links, errors in accessing pages) were encountered on the other websites; the NSF homepage alone contained six compliance errors.

## Visual Appeal

The CCT website's visual appeal is equal or superior to that of other sites. The NIAID site design is of poorer quality, with excessive white space, hard-to-read text, and lack of visual separation between elements to guide the viewer's eye. The other three sites are more visually appealing. NCCAM's design is clean and simple, OITE's layout is uncluttered and makes excellent use of color, and the NSF homepage (Figure 8) features a strong, modern grid design with good contrast and vivid, eye-catching photos.

The CCT website employs a simple grid system that uses white space to provide structure. In accordance with best practices, multiple ways for visitors to connect with CCT and NCI are displayed "above the fold." Attention-getting features on the CCT Homepage (Figure 9) include the gold medal ribbon promoting NCI's rank among top places for training and the mobile app download link.

Figure 8. National Science Foundation Homepage



Figure 9. CCT Homepage



The home page displays colorful, realistic images of people and makes good use of white space.

An eye-catching gold medal image supports the message that NCI offers high-quality training opportunities.



**Presentation of Information in Lists and Tables.** The CCT website presents key information in tabular format that is easy for site visitors to scan. However, awkward formatting of a few tables lessens their effectiveness. For example, the Award Type column in the CCT Program Contacts table (Figure 10) is too wide compared with the Program Directors column.

**Figure 10. CCT Table with Wide Columns (March 2013)**

<p>The table title is not as prominent as the column heads.</p>	<table> <tr> <th colspan="2">Program Contacts for Cancer Training Funding outside of NCI (Universities and Other Institutions)</th></tr> <tr> <th>Award Types Managed by Cancer Training Branch</th><th>Program Directors</th></tr> <tr> <td><a href="#">F30</a></td><td><a href="#">Dr. Erica Rosemond</a></td></tr> <tr> <td><a href="#">F31</a></td><td><a href="#">Dr. Erica Rosemond</a></td></tr> <tr> <td><a href="#">F32</a></td><td><a href="#">Dr. Sonia B. Jakowlew</a></td></tr> <tr> <td><a href="#">F33</a></td><td><a href="#">Dr. Sonia B. Jakowlew</a></td></tr> <tr> <td><a href="#">K05</a></td><td><a href="#">Dr. Susan N. Perkins</a></td></tr> </table>	Program Contacts for Cancer Training Funding outside of NCI (Universities and Other Institutions)		Award Types Managed by Cancer Training Branch	Program Directors	<a href="#">F30</a>	<a href="#">Dr. Erica Rosemond</a>	<a href="#">F31</a>	<a href="#">Dr. Erica Rosemond</a>	<a href="#">F32</a>	<a href="#">Dr. Sonia B. Jakowlew</a>	<a href="#">F33</a>	<a href="#">Dr. Sonia B. Jakowlew</a>	<a href="#">K05</a>	<a href="#">Dr. Susan N. Perkins</a>
Program Contacts for Cancer Training Funding outside of NCI (Universities and Other Institutions)															
Award Types Managed by Cancer Training Branch	Program Directors														
<a href="#">F30</a>	<a href="#">Dr. Erica Rosemond</a>														
<a href="#">F31</a>	<a href="#">Dr. Erica Rosemond</a>														
<a href="#">F32</a>	<a href="#">Dr. Sonia B. Jakowlew</a>														
<a href="#">F33</a>	<a href="#">Dr. Sonia B. Jakowlew</a>														
<a href="#">K05</a>	<a href="#">Dr. Susan N. Perkins</a>														
<p>The Award Types column is too wide.</p>															

By adjusting column widths to better accommodate cell content and enlarging table titles, CCT improved readability of several tables on the website, including the CCT Program Contacts table (Figure 11).

**Figure 11. CCT Table with Adjusted Column Widths (October 2013)**

Program Contacts for Cancer Training Funding outside of NCI (Universities and Other Institutions)	
Award Types Managed by Cancer Training Branch	Program Directors
<a href="#">F30</a>	<a href="#">Dr. Mark Damico</a>
<a href="#">F31</a>	<a href="#">Dr. Michael Schmidt, Dr. Mark Damico</a>
<a href="#">F32</a>	<a href="#">Dr. Sonia B. Jakowlew</a>
<a href="#">F33</a>	<a href="#">Dr. Sonia B. Jakowlew</a>
<a href="#">K05</a>	<a href="#">Dr. Susan N. Perkins</a>

## Interactivity

OITE's Eligibility Wizard (Figure 12) is an excellent example of an interactive tool that allows potential trainees to explore training opportunities based on eligibility criteria. The tool is visually engaging, informative, and likely of great interest to visitors. This is a tool to which visitors may return again and again as their career and educational attainments change.

**Figure 12. OITE Eligibility Wizard**



## Heuristic Assessment

The full Heuristic Assessment Report (Appendix C) provides details on CCT's compliance with these standards, policies, guidelines, and best practices. Recommendations for compliance with NCI requirements and policies and for following best practices described in the scorecards are included in the Recommendations section of this report.

### NCI Content Standards and Web Policies

The CCT website meets all NCI visual standards such as proper use of the NCI minibanner, application of the NCI color palette, and inclusion of colorful, realistic images of people and most of the NCI Content Standards (11 out of 13). The site adheres to NCI's preferred word usage standards and includes recommended content elements (e.g., headings, subheadings, hyperlinks within text).

Reviewed pages include all required content elements except a date, which serves as a key indicator of content currency. Although the site has key navigation links and page options (a tool that invites readers to engage in the content by enabling them to print the page, email the document, and/or bookmark and share the page), several pages on the site would benefit from adding "jump" links and "back to top" links to help visitors scan and find specific information more quickly. For example, the Cancer Training at NCI page is over more than three screen views long and includes three tables as well as links to a resume database and to NCI training opportunities organized by career stage.

NCI Web Policies address various legal issues such as endorsement and liability, privacy and security, copyright, Freedom of Information Act requirements, accessibility, and exit disclaimers. In most cases, CCT compliance is achieved via links to the relevant NCI policy pages in the page footers. CCT complies with the exit disclaimer policy, and the majority of web pages comply with Section 508.

## Federal Guidelines and Evidence-Based Best Practices

Overall, CCT missed the target passing score by 37 points. The site scored acceptably on Collaboration/Avoiding Duplication and Federal Laws, Regulations, and Other Directives and came within 1 point of passing Usability, Accessibility, and Design.

However, the site does not follow a number of key guidelines, including those for readability, customer service response times, and consistent placement of text links to the CCT Homepage on every web page. In addition, the site lost points in the site planning and maintenance area due to a lack of standard operating procedures (SOPs) intended to ensure routine review of external links, timeliness of content, and compliance with plain language standards.

## Site Performance Standards Best Practices

The CCT website missed an overall passing score in this area by only 3 points (total score=18, passing score=21), achieving better-than-passing scores in the areas of Presentation (how well visual appearance supports visitor success) and Trust (visitor confidence). However, improvement is needed in Value (visitor ability to accomplish specified goals) and Navigation (whether menu items and other navigation scheme components support visitor ability to accomplish specified goals).

Completed scorecards are available in Appendix C. Recommendations for achieving compliance with NCI standards and policies and for correcting other weaknesses identified during the Heuristic Assessment are summarized in the Recommendations section of this report.

## Usability Testing

Response to the website was generally positive in both test rounds. Participants indicated that they found the website visually appealing and appreciated the comprehensiveness and clarity of site content.

- *It's very clean, ...white with some colors. There's clear bullet points and different font sizes to kind of show you the different categories and the links are really easy to see. It's appealing to the eye.* — Researcher
- *I've applied for a grant recently and I don't remember finding anything else this clear-cut from my own Institute. I had to find the information on my own. So this [website] would have been helpful to me.* — Grantee
- *It offers pretty comprehensive information.* — Grantee

Several participants complimented the site's Page Options feature.

- *I also just noted that you have a Bookmark and Share feature, which I think would be very useful for directing postdoctoral fellows to particular opportunities that would be relevant to them. But that's a nice feature, as well as the Email This Document. So that's really wonderful. More websites should have that.* — Grant Administrator

Others appreciated the inclusion of the contact information.

- *There was generally an individual contact person that you could contact to speak to someone or to get additional help. A lot of times, you'll just get either a generic phone number or a general email box to send inquiries. But for each of the areas, there were specific people you could talk to if you're talking about different mechanisms...I mean it's laid out there who those people are and what their email address is. I think that's a good approach.* — Researcher

Most participants agreed that site content seems to be up to date. One participant was quite impressed that the award information reflected the latest policy information.

- *All the K award announcements just changed three weeks ago, and so did the T32 announcement. ... I see CCT has 14-04-6, so they're more up to date than we are; they're on top of that.* — Researcher

However, others noted that the reference to the 2012 postdoc survey on the homepage gave the impression that the site had not been updated.

- *Just by looking at it and without posting “last updated on a certain date”...it kind of looks like they haven’t updated the site since 2012. — Grantee*

In both rounds, testers expressed some frustration with specific aspects of the CCT website. Testers had difficulty finding specific information. Several reported having difficulty understanding how content was organized on the site.

- *It reminds me of a lot of other government websites I’ve been to before...that they are very good about putting the content somewhere but you have to go on a scavenger hunt to find where that content is. — Grantee*
- *The distinction between the intramural fellowships and the extramural was kind of hard to figure out. — Researcher*
- *I work in a training institution and my postdoctoral fellows are more interested in extramural funding... I did not find that [extramural information] readily. — Grant Administrator*

Several test participants had difficulty staying within the boundaries of the website; they clicked on NCI main menu items and had difficulty finding their way back to the CCT website. Several commented that the NCI menu across the top seemed more dominant than the CCT-specific navigation options on the left.

- *When you’re on the training page, you could see on the top that Research and Funding is highlighted, so I thought if I clicked on Research and Funding, I would easily have been able to get back to the Cancer Training site, and that wasn’t the case. — Researcher*
- *I tend to be more drawn over here in the middle. I haven’t really trained my brain to look over here on the side. I’m trying to get used to it. — Researcher*
- *Well, I think it was that bar, the top bar with the tabs, where it was easy to get onto a completely different section. — Grantee*

The award-specific navigation menu confused several participants.

- *I didn’t look to the left. I just scrolled down because I thought that gray box was the same one that was always there. — Grantee*
- *I would say that [the award-specific navigation] is not an attractive feature of the layout because when you click from the homepage to one of the other kind of bigger subsections, it stays the same as it did on the homepage, but then when you click on the grant, it changes to grant-specific information. — Grantee*

Some participants described certain web pages (e.g., About the CCT, and funding opportunities for individual career stages) as “text-heavy,” and reported reluctance to closely read dense text in order to spot details they needed.

- *Some pages had a lot of heavy text, dense text. ... If it could be like in a table format like some of the pages, that would be I think helpful. — Grantee*
- *I tried to go in-depth to some of the pages but they seemed a bit text-heavy. — Researcher*

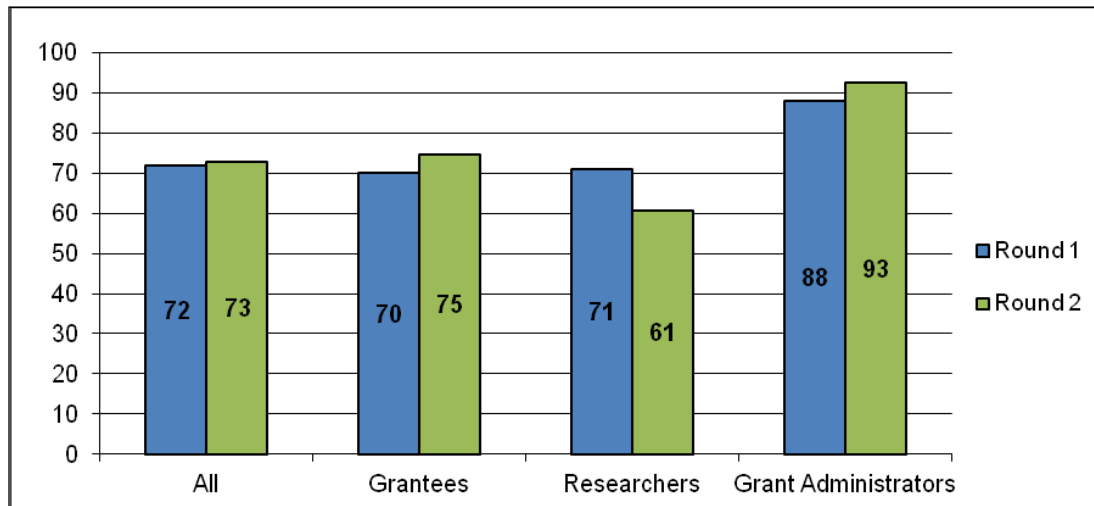
One test subject noted that the photo feature on the homepage did not reflect diversity of scientific disciplines.

- *Well, as a non-lab researcher, I noticed that all the pictures are of basic science. And so I look at this and I think, “Is this relevant for me?” — Grantee*

## Satisfaction

In both test rounds, test participants completed the SUS as a measure of their satisfaction with CCT website usability. As shown in Figure 13, average usability scores increased slightly overall (.7 points) in Round 2, with average scores improving for every participant group except Researchers (-10.2 points). In both rounds, grant administrators reported the highest level of satisfaction with the website.

**Figure 13. Average System Usability Scores, Round 1 Versus Round 2**



## Performance

During Round 1 and 2 usability tests, NOVA collected the following performance data: completion rate, error-free rate, and time on task. Performance goals for each task in the usability test were a completion rate of 80 percent and an error-free rate of 75 percent.

Changes in performance rates are shown in Table 6.

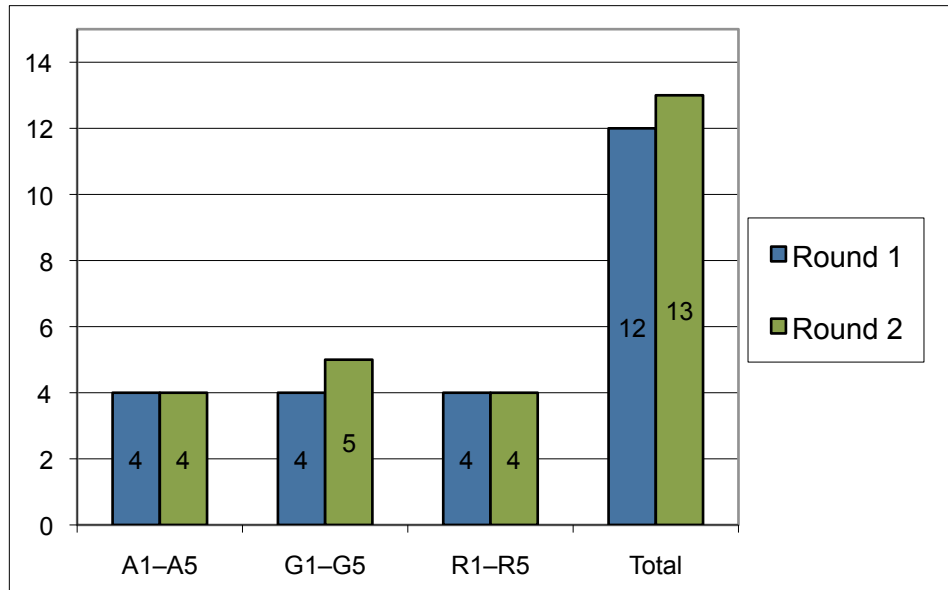
**Table 6. Changes in Performance Rates Between Round 1 and Round 2**

Task #	Question	Completion Rate (%)			Error-Free Rate (%)		
		R1	R2	Change	R1	R2	Change
A1	CCT mission	92	100	8	83	92	9
A2	HS eligibility	67	83	16	67	50	-17
A3	2 non NIH orgs	92	100	8	75	100	25
A4	Kaplan duration	100	100	0	83	67	-16
A5	NCI's rank in <i>The Scientist</i>	83	100	17	50	92	42
G1	PD for Calabresi K12	100	100	0	88	75	-13
G2	Foreign nationals	50	38	-12	25	38	13
G3	K Award – translational	100	86	-14	100	43	-57
G4	K Award - electronic app	100	100	0	88	75	-13
G5	Next T32 deadline	88	100	12	38	63	25
R1	TTC program contact	100	100	0	100	50	-50
R2	NCI CTB chief	75	100	25	25	25	0
R3	Who administers CCT grants	100	75	-25	50	50	0
R4	How to contact CCT	100	100	0	100	75	-25
R5	Train for future brochure	100	100	0	75	100	25

### Completion Rates

In Round 2, the 80-percent target completion rate was achieved for the majority of tasks (Figure 14). This represents a single-task improvement in completion rate (a 2-point increase). The exceptions were G2, foreign nationals' eligibility (38%, a 12- point drop from Round 1), and R3, who administers CCT grants (75%, a 25-point drop from Round 1).

**Figure 14. Tasks Meeting Target Completion Rate (80%), by Round**



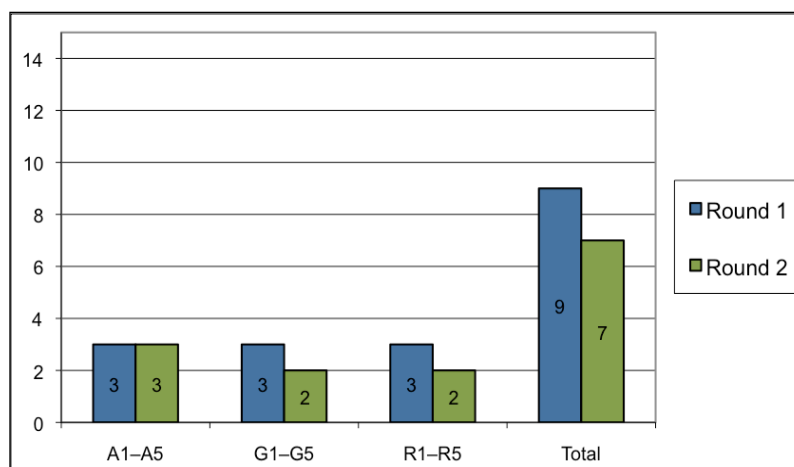
Completion rates improved for all common questions, with most significant improvements on A2 (high school eligibility, +16) and A5 (NCI's rank in *The Scientist*, +17). For grantee-only questions, completion rates did not change for two questions (G1, G4), improved on one question (G5, next T32 deadline, +12), and fell on two questions (G2, foreign national eligibility, -12; and K Award for established investigators in translational science, -14). For researcher/grant administrator questions, completion rates did not change for three questions (R1, R4, R5), improved for one question (R2, NCI Cancer Training Branch [CTB] chief, +25), and fell for one question (R3, who administers CCT grants, -25).

### Error-Free Rates

In Round 2, the 75-percent target error-free rate was met for three-quarters of the tasks (Figure 15). This represents a two-task decline (a 2-point decrease) in the error-free rate. Error-free rates increased for all except two common tasks: A2 (high school eligibility, -17) and A4 (Kaplan duration, -16).

Error-free rates for grantee questions improved for two questions (G2, foreign nationals eligibility, +13; and G5, T32 deadline, +25) and fell for three questions (G1, program director for Paul Calabresi award, -13; G3, K Award for established investigators in translational science, -57; G4, electronic applications for K Awards, -13).

**Figure 15. Tasks Meeting Target Error-Free Rate (75%), by Round**



### Time on Task

Average time on task (TOT) was reduced for 8 out of 14 tasks, with an overall 6-second reduction of average TOT. Changes in TOT ranged from a 52-second decrease (task A5) to an increase of 115 seconds (task R1). TOT for Rounds 1 and 2 are displayed in Table 7.

**Table 7. Comparison of Round 1 and 2 Times on Task**

Task #	Question	Average Completion Time (seconds)		
		R1	R2	Change
A1	CCT mission	30	28	-2
A2	HS eligibility	59	57	-2
A3	2 non NIH orgs	51	27	-24
A4	Kaplan duration	91	82	-9
A5	NCI's rank in <i>The Scientist</i>	95	42	-52
G1	PD for Calabresi K12	60	40	-20
G2*	Foreign nationals			
G3	K Award translational	49	141	92
G4	K Award electronic	49	55	6
G5	Next T32 deadline	112	68	-44
R1	TTC program contact	32	147	115
R2	NCI CTB chief	109	95	-14
R3	CCT grants	84	117	33
R4	CCT email	27	33	6
R5	Train for future brochure	41	27	-14

\*Completion times for G2 are excluded from comparison because the task was changed for Round 2.

It should be noted that the TOT change for R1 was unexpected. Of the four participants who completed this task, two completed the task in 12 seconds or less, and two used more than 270 seconds each to complete the task. No explanation for the dramatic time variance could be established.

### Impact of Website Changes

It was hypothesized that website improvements would have a positive impact on performance during Round 2. The mixed satisfaction and performance results described above suggest that changes were not



sufficient to improve overall user satisfaction and performance in a meaningful way. However, several website changes can be linked to performance improvements, as noted below.

### **Change “Center for Cancer Training” to “CCT Home”**

After Round 1 testing, the CCT navigation menu was revised slightly (Figure 16). “Center for Cancer Training” was changed to “CCT Home.” This change contributed to improved TOT and performance rates for one task that required test participants to return to the homepage from anywhere except an award-specific page (task R5). For this task, average TOT decreased by 15 seconds; the completion rate remained stable at 100 percent; and the error-free rate improved 25 points (to 100%).

**Figure 16. New CCT Menu**

<b>CCT Home</b>
▸ <b>Cancer Training at NCI</b>
▸ <b>Funding for Cancer Training</b>
▸ <b>Other Fellowships and Internships</b>
▸ <b>About the Center for Cancer Training</b>
▸ <b>Contact Information</b>

### **Add “CCT Home” to Quick Links**

After Round 1, NOVA recommended adding “CCT Home” to the top of the award-specific navigation menu. However, this change was deemed too time- and labor-intensive. Instead, “CCT Home” was added under Quick Links on all award-specific pages. This change contributed to performance improvements for grantees (because they were on an award-specific page when this task was assigned). For grantees, TOT decreased by 83 seconds; the completion rate improved by 25 points; and the error-free rate improved by 50 points.

### **Consolidate CCT Contact Information**

After Round 1 testing, the list of CTB staff was moved to the Contact Information page. This change produced mixed results. It contributed to improved TOT and completion rates for task R2, identifying the chief of the CTB. Average TOT was reduced by 14 seconds, and the completion rate increased 25 points (to 100%). However, only 25 percent of participants completed this task error free.

### **Change “Submitting an Application” to “How to Apply” on Award-Specific Pages**

After Round 1, NOVA recommended changing “Submitting an Application” to “How to Apply” on the award-specific navigation menu. The impact of this change was most obviously reflected in performance on task G5, identifying the next T32 application deadlines. Average TOT was reduced by 43 seconds; the completion rate increased by 12 points (to 100%); and the error-free rate improved by 25 points, although at 63 percent this rate was below target.

## **FINDINGS**

During the course of the evaluation, specific CCT website strengths and weaknesses were identified. This report section combines findings from the competitive analysis, heuristic assessment, and usability testing components of the evaluation to highlight areas in which the website excels and where improvement is needed.

### **Strengths**

#### **Content and Content Management**

- The site includes required and recommended Content, such as the mission statement on the About the CCT page. Several participants made special note of the site’s Print, Email, and Share Page options, which they said were particularly useful.



- Content is comprehensive. Usability test participants complimented the depth and breadth of the information on the site. The Contact Information page provides a comprehensive list of program contacts and Cancer Training Branch staff.
- Content is current. One researcher was especially impressed that the site reflects recent policy changes for several awards.
- The CCT site uses common expressions and generally used terminology and refrains from using acronyms and undefined technical terms.

### **Visual Appearance/Presentation**

- The site meets NCI Visual Standards, including proper use of the NCI minibanner, application of the NCI color palette, hyperlinks within text, cross-agency links, and text links to policies, accessibility, and FOIA.
- Usability test participants described the site as visually appealing and complimented its clean lines and use of white space. The competitive analysis indicates that the website's visual appearance is superior to that of other sites.
- Based on the heuristic assessment, the site's presentation is excellent; graphics, icons, and symbols are easily understood and support users' ability to meet their information-seeking goals on the site. In addition, links display destinations when rolled over, and the mouse cursor display changes to a hand symbol.
- Text is legible and easy to read.
- Interactive elements (e.g., links to PDFs) are appropriately sized and spaced and do not require complex mouse movements.

### **Trust**

- Navigation elements and page titles consistently confirm that the correct page has loaded.
- Interactive elements are easily recognizable and behave as expected.

### **Usability, Accessibility, and Design**

- The site provides access to documents using open, industry standard/native web formats (e.g., HTML) or alternative formats (e.g., PDF) that do not impose unnecessary burdens for the intended audience. These file formats offer the greatest flexibility for visitors. The site provides a link to the downloadable free Adobe viewer in the footer.
- The site design works well on lower-end hardware, multiple browsers and versions of browsers, multiple operating systems, low connection speeds, and low screen resolutions. HTML page sizes average less than 20 kb, which minimizes page download times to accommodate visitors with low connection speeds.

### **Search Function**

- A search box appears on every page, is entitled "Search," and is positioned in the upper third of the page.
- Search results are produced in less than 3 seconds and are displayed in an easy-to-read format with the search term shown at the top of the page.

### **Management and Governance**

- Site visitors can identify the CCT site as an official federal website and trust that it provides accurate information. The site complies with most requirements for federal public websites, and plans are in place to bring the site into compliance with those requirements it does not currently meet.

- A training plan is in place to ensure that CCT staff who have website responsibilities receive the training required to do this work.

## **Weaknesses**

### **Site Planning and Maintenance**

- SOPs are lacking for updating, approving, and maintaining content during emergencies and reviewing external links.
- There is no formal structure for developing web content policies and requirements in an ongoing process.
- There is no formal plan to periodically review best practices of other sites to incorporate them into the CCT website. (The competitive review conducted as part of this evaluation should be repeated on a regular basis.)
- CCT does not follow Citizen Service Levels Interagency Committee (CSLIC) guidelines for “customer” service response times. A test inquiry to four separate contacts had mixed results: two prompt replies, one reply after 5 days (the inquiry went into the respondent’s junk mail), and no reply to the fourth inquiry.

### **Search Function**

- The search function reports results from the entire NCI website rather than exclusively CCT pages.
- Search results are not sorted by relevance or currency, and search terms themselves are not highlighted in the results.
- Users cannot refine search results.
- Wildcard searches are not enabled.

### **Value**

- The CCT Homepage does not directly explain what CCT is or what it does.
- The site lacks both an organizational chart and a complete staff contact list.

### **Content**

- Some site content does not meet plain language standards and scores below targets for reading ease.
- Usability test subjects reported having difficulty understanding how content is organized. They reported that some navigation menu options seem to overlap.
- Participants described some pages as “text-heavy” and expressed a preference for table layouts that they could easily scan.

### **Required and Recommended Content**

- The site fails to display a date showing that it is current, that it has been reviewed within the past 12 months, or that it contains historical material. The date serves as a key indicator of content currency, and at least one usability test participant noted its absence.

## **RECOMMENDATIONS**

Recommendations from all previously submitted reports are provided below. CCT staff are encouraged to review and prioritize the recommendations in a way that reflects urgency of the identified issue and availability of resources. When changes require more resources than are feasible, CCT might consider establishing an SOP that complies with specific guidelines and applying it to all new content. For

example, to improve readability of site content, use the MS Word readability statistics function to test all new text and revise it as needed to reduce use of passive voice and meet other target reading ease and grade level scores before posting it to the site.

Source reports for each recommendation are provided in parentheses. CA indicates Competitive Analysis, HA indicates Heuristic Assessment, and UT indicates Usability Test.

## **Content**

- Improve readability of site content: target Flesch Reading Ease score of 45 or above and Grade Level of 10 or lower. Compose sentences in active rather than passive voice. (CA)
- Review text-heavy pages for wordiness and reformat for easier scanning. (CA, UT)
- Format lists for easier scanning. (CA, UT)
- In tables, ensure that row length does not cause type to “run off” the edge of the page; “float” header row text so that users can see what category each column contains as they move down the page; where possible, make columns sortable to increase their functionality. (CA, HA)
- Include a date posted, reviewed, updated, or last modified on every page. (CA, HA, UT)
- Add “jump” or “back to top” links to long pages such as the Cancer Training at NCI page. (HA)
- Review images to ensure that a broad variety of sciences are represented, not just basic science. (UT)
- Create a comprehensive CCT staff directory that includes a mailing address, telephone number, and email address for each entry; add an organizational chart. (HA)
- Review the About the CCT page to ensure that it clearly states what CCT is and what it does; clarify the role of the Cancer Training Branch; add a brief history of CCT. (HA, UT)
- Consistently use one term for each stage (e.g., postdoctoral, predoctoral) if the terms refer to the same experience level; otherwise, clarify distinctions between terms that sound like the same thing but are not (e.g., postdoctoral, postdoctoral fellow). (HA, UT)

## **Section 508**

- Correct empty link on homepage. (CA, HA)
- Add alt text to the medal graphic on homepage. (CA, HA)
- Make the Train for the Future brochure PDF accessible (multiple issues identified). (CA, HA)

## **Site Planning/Maintenance SOPS and Policies**

- Develop policies and practices to ensure that content meets plain language criteria. Set readability targets (e.g., Flesch Reading Ease or Flesch Grade Level) and use language tools to evaluate readability of all new content and regularly review the homepage and major entry points to ensure they are written in plain language appropriate for the site’s intended visitors. (CA)
- Develop SOPs for updating, approving, and maintaining content during emergencies. (HA)
- Develop SOPs for reviewing external links for appropriateness and relevance. (HA)
- Establish a formal structure for developing web content policies and requirements in an ongoing process. (HA)
- Develop a formal plan to periodically review best practices of other sites to incorporate them into the CCT website. (The competitive review conducted as part of this evaluation is a good beginning that should be repeated on a regular basis.) (HA)
- Set up an automated email response to the generic information email address, including a statement about the CCT policy for responding to inquiries. (HA)

## Navigation

- Explore the possibility of eliminating the NCI menu across the top of the page. (UT)

## Search Function

- Work with NCI staff responsible for developing search algorithms to ensure that a search combining training, NCI, and rank will produce the CCT Homepage among the top results. (HA)
- Make the search function specific to the CCT site so that search results are limited to CCT pages. If this is not possible, CCT pages should be listed at the top as most relevant. (CA)
- Upgrade the search results display to make results sortable by relevance and date. Highlight the user's search term in search results. Consider including an advanced search feature. (CA)

## Interactive Elements

- Add more interactive elements that will engage visitors, similar to the OITE Career Award Wizard. (CA)
- Consider creating a "Notify me" service that informs potential trainees when new information or deadlines are posted. (CA)
- Develop a simple interface for a searchable database that includes all training opportunities. Criteria should include career stage, location (at NCI/not at NCI) or intramural versus extramural, and discipline(s); and short-term (e.g., summer) versus long-term assignments. Allow visitors to select multiple variables within criteria. Results would include links to opportunity pages with standard sections devoted to activity description, eligibility criteria, how to apply, etc. (CA)

## Miscellaneous

- Remove the graphic notice next to the Department of Defense link on <http://www.cancer.gov/researchandfunding/cancertraining/other/outsidenih>. (HA)

## CONCLUSION

In brief, the CCT website is a source of important information. To ensure that the site is as useful as possible, it is recommended that the corrective steps described in this report be taken. Emphasis should be placed on addressing issues related to readability, navigation, and the search function.

## **APPENDIXES**

**Appendix A. Web Traffic Report**

**Appendix B. Competitive Analysis Report**

**Appendix C. Heuristic Assessment Report**

**Appendix D. Round 1 Usability Testing Report**

**Appendix E. Round 2 Usability Test Script**