

Usability Testing of the NCHS Website

Results of interviews conducted August, 2010

Interviewing Team: Aaron Maitland, Heather Ridolfo, Stephanie Willson, Kristen Miller, Caroline Gray

NCHS Contact: Sharon Ramirez

Introduction

This report documents usability testing of the NCHS website. The testing took place at the 2010 National Conference on Health Statistics. The report that follows details respondents' performance on 11 usability scenarios that asked respondents to find various web pages or pieces of information on the NCHS website. The scenarios were planned based on conversations between staff from the Office of Information Services (OIS) and the Questionnaire Design Research Laboratory (QDRL). A number of the scenarios replicated those that were utilized during a usability test at the 2008 NCHS Data Users Conference. Respondents also completed questions included in the System Usability Scale (SUS), which is a commonly used scale to evaluate the usability of a system. QDRL staff conducted qualitative interviews that measured respondents' performance on the usability scenarios and the SUS.

Methodology

The usability testing of the NCHS website utilized a mixed method approach. Interviews for the project took place at the 2010 National Conference on Health Statistics in a private room. QDRL staff conducted all interviews. The interviews consisted of two parts. The complete research protocol is shown in Appendix A. First, respondents completed eleven usability scenarios. For each scenario, the respondents were either required to find a webpage on the NCHS website or they were asked to find a piece of information from the website. The specialized usability software Usability Testing Environment (UTE 3.0) was installed on laptops in order to measure the respondents' performance on the scenarios. For example, the software recorded information such as which web pages the respondents visited during a scenario, how long respondents visited each page, and the number of clicks that the respondents made during each scenario. In addition, respondents were asked to think aloud during the completion of the scenarios and the interviewer occasionally asked follow-up questions of the respondents to understand their experience during each scenario.

Respondents completed the SUS for the second part of the interview. The SUS is a commonly used quantitative measure of the usability of a system. In addition to completing the SUS, cognitive interviewing techniques were used to understand the thought processes that respondents used to answer the questions. The interviewers primarily used follow-up probes to elicit information from respondents about how they answered the questions. For example, after the respondent answered the question the interviewer might ask, "What were you thinking about when you answered this question?" The information elicited from these follow-up probes

allowed us to understand the quality of the questions in the SUS and also provided useful feedback about which aspects of the NCHS websites the respondents like or had problems with.

At the very end of the interview respondents were asked a question about social media like Facebook or Twitter. The purpose of this question was to gauge the respondents' interest in receiving updates about NCHS products via social media.

Sampling and respondent demographics

We recruited respondents for this study through registration for the conference. Registrants for the conference were asked a question on the registration module about whether they would be willing to participate in a usability test of the NCHS website at the conference. QDRL staff then obtained a list of those interested in the testing and eventually selected 20 respondents for the study. The final study included seventeen respondents since three had to cancel during their stay at the conference. We made an effort to recruit respondents with various levels of sophistication. For example, we attempted to recruit data users with graduate degrees and those without. We also attempted to differentiate between data users who download data and those who primarily download reports from the website. Table 1 shows the demographics of the final sample.

Table 1. Sample demographics.

Gender	N
Male	3
Female	14
Age	
40 and under	6
41-50	4
50 and over	7
Education	
Bachelor Degree	2
Masters Degree	13
Ph.D.	2
Use statistical software	
Yes	10
No	7

Results

Summary of findings

Variety of data users. The NCHS website is visited by a variety of users. In general, anyone who visits the site is performing one of three tasks: downloading or accessing data, browsing publications, or finding quick facts. The structure of the current homepage recognizes these different tasks. In our test we encountered data analysts primarily interested in downloading data, data analysts primarily interested in retrieving information from reports, and generalists who visit the site to see the latest releases of public health data and information.

The results of our test show that the current website works best for data analysts who visit the website for a specific purpose and generally know where to look for the information that they need such as data sets or reports. However, even these respondents can have problems when they are asked to find information they are not use to finding. For example, data analysts were the most likely respondents to attempt to find information through the websites of the survey systems and ignore other sections of the website like Fastats.

Website strategies. Visitors to the NCHS website employ different strategies for finding information. The ‘Emergency Room’ and ‘Obese Kids’ scenarios below demonstrate the different strategies best. For these scenarios, the respondents were not provided any cues for finding the necessary information. Respondents could have answered these scenarios in very different ways; however, there were really three dominant strategies. First, some respondents chose to answer both of these scenarios through Fastats. This was the quickest route to the answer and it also turned out to be the most accurate. Second, respondents determined which survey collects the appropriate data and attempted to find the information on the webpage for that survey. This strategy takes more effort and was often unsuccessful. Third, respondents chose to perform a search by using the general search box, browse/search publications, or the A-Z index. As expected, the utility of the search strategy depended upon which results the respondent chose to follow.

Each of the strategies above was common, but the difference in outcomes (success) has an important implication for the evaluation of the website as a whole. In particular, the difficulty of finding information on the pages of the surveys may point to a potential problem with some of the lower level pages. Although many publications and findings are available on the surveys’ websites, they are often organized by report number rather than being indexed by something potentially more useful like topic. Furthermore they are usually found on separate pages from the data.

Education of data users. An underlying theme throughout the interviews was the need to educate data users up front about the agency and the data it collects. In particular, the website needs more of an educational tone to be more effective for groups like students, journalists, and the general public. Respondents thought that the homepage lacked basic information about NCHS and the surveys it conducts. This makes it difficult for less sophisticated to perform key tasks. They would likely need more guidance on how to find different types of information on the website. For example, there could be a section on the homepage that describes how to perform the central tasks through frequently asked questions or some other format.

Website features. There are features of the current website that could be enhanced. First, respondents generally liked the left navigation pane and the way that it details the important aspects of the website on the homepage. However, respondents were split about how this feature was used on other pages. Some liked the way that the each webpage contained the most useful information on the left. Those who figured out this organization on the website were the most successful on the test. Others were used to the left navigation page being static and did not initially pay any attention to it on the lower page. It was only after a few scenarios that a couple of the respondents discovered that the left navigation pane changed from page to page. Furthermore, a few respondents had difficulty in the test returning to pages that they had

previously visited. Not everyone noticed that the bread crumbs serve this function. Some thought that a more static left navigation pane might help visitors navigate the site better.

The A-Z index at the top of the homepage caused confusion during the test. Respondents generally find indexes helpful and integrate them into their normal strategy for finding information on the website. However, the index at the top of the screen rarely provided useful information and hence the respondents usually resorted to a search or some other strategy when they learned that the A-Z index was not useful. This was true for several of the scenarios in the test. Furthermore, the links in the index would often take the respondents off the NCHS website and onto the CDC website with no clear path to return to the NCHS website.

Although it was not specifically included in the test, there were a few comments about the integration of data, documentation, and publications. In terms of data and documentation, one respondent mentioned that he found it frustrating when surveys have multiple data sets with documentation that need to be downloaded separately. He thought it would be useful to have all of the data and documentation downloadable in a single file for a specific year. He also thought that it is much more useful to have documentation in pdf format rather HTML because it is easier to store and search.

Summary Statistics

Figures 1-3 summarize how the respondents performed on each scenario in the test. Figure 1, demonstrates the overall success rates for each scenario. The darker shaded bars in Figure 1 show the percentage of the respondents who answered the scenario correctly within 2 minutes and 30 seconds. The lighter shaded bars show the percentage who answered the scenario correctly without any time limit. Respondents were not cut off from completing the scenarios during the test; however, we show the 2 minute 30 second time frame in Figure 1 to maintain consistency between the findings for this test and the test conducted during the previous conference in 2008.

Figure 1 illustrates that respondents were the most successful on the Data Brief, Health, United States, Nutrition Exam and 2010 release schedule. Generally, these scenarios only required the respondents to find a web page or very simple information like the number of a data brief. Respondents were least successful on the Q-Bank, Emergency Room, and Health Data Interactive scenarios. It is important to note that the Q-Bank and Health Data Interactive scenarios required the respondents to perform unique tasks such as search a database or manipulating tables. There is extensive discussion about issues encountered during the the Emergency Room scenario later in this report.

Figure 1. Percentage of respondents completing each scenario successfully.

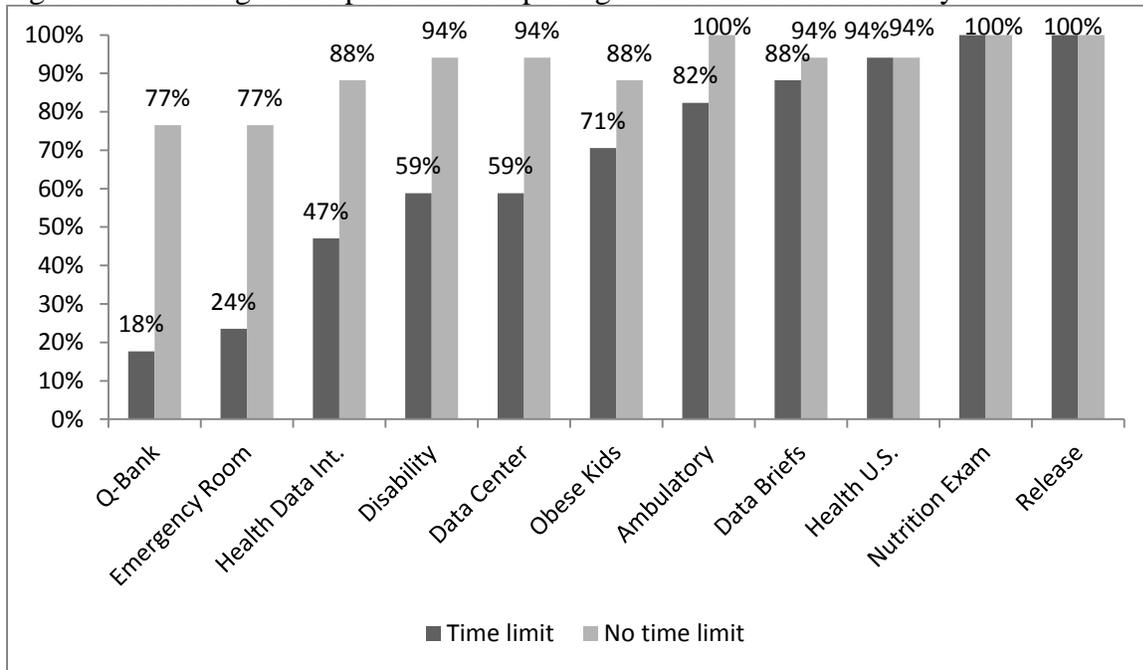


Figure 2 illustrates the average length of time that it took the respondents to complete the scenarios. The results in Figure 2 are similar to those in the first figure. Respondents were able to complete the nutrition exam and 2010 release schedule scenario in the shortest period of time. The Q-Bank and Emergency Room scenarios required the most time to complete.

Figure 2. Average length of time (in seconds) for respondents to complete scenarios.

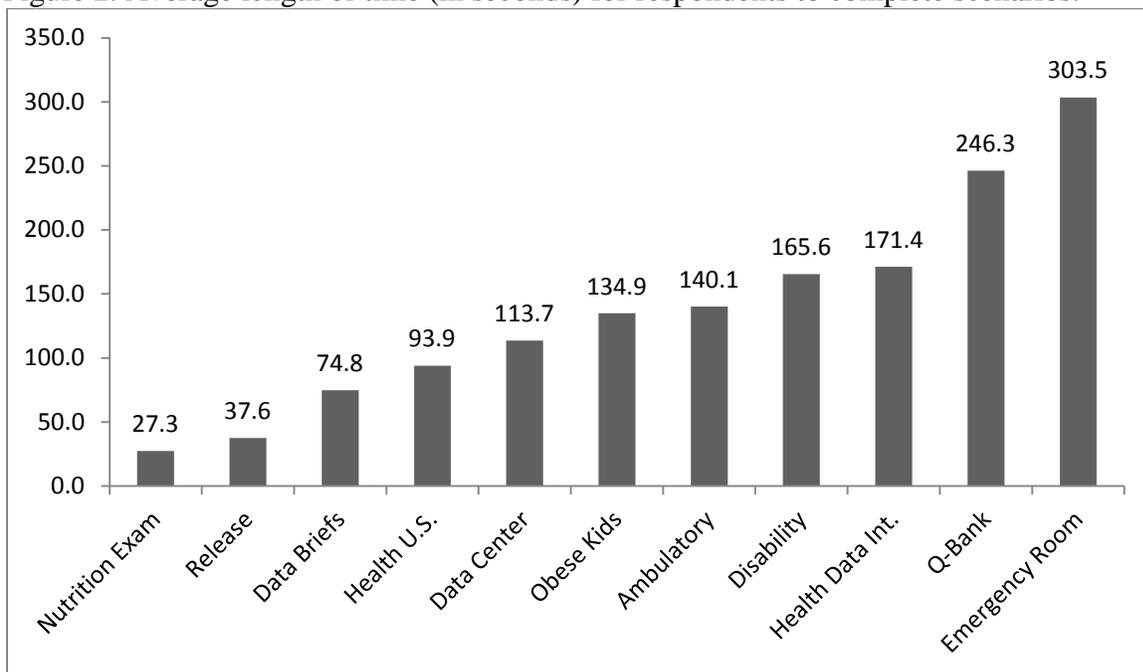
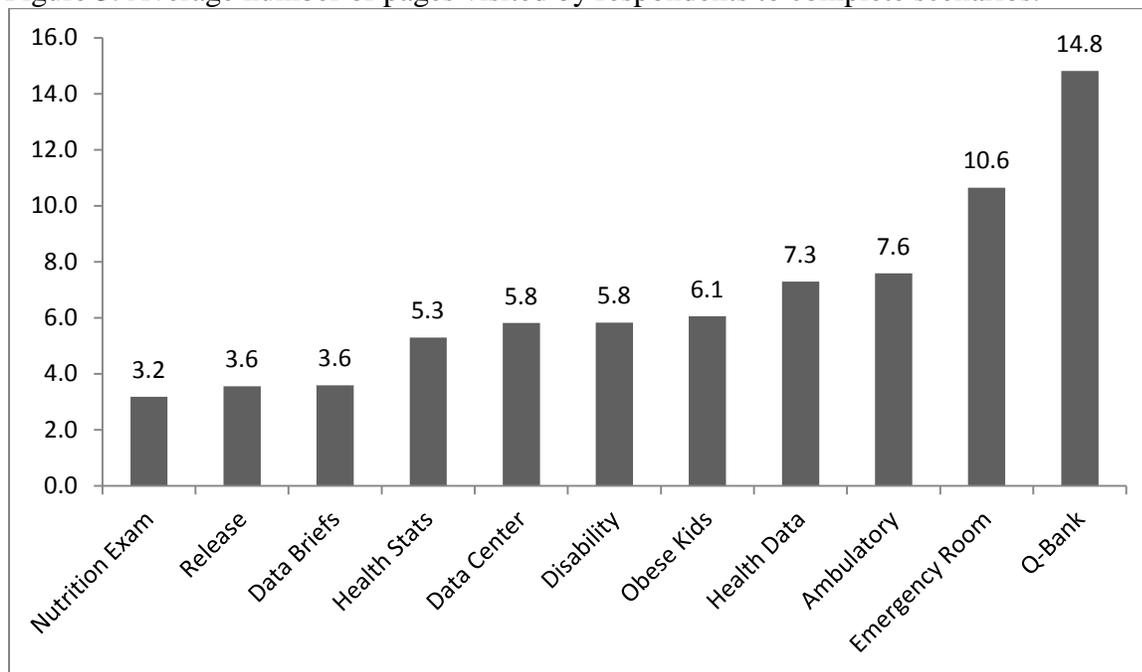


Figure 3 illustrates the number of pages that respondents visited to answer the scenarios. As expected, the same general ordering of scenarios occurs between Figures 2 and 3.

Figure 3. Average number of pages visited by respondents to complete scenarios.



Scenario by Scenario Review

This section reviews the analysis of each scenario and illustrates why some scenarios were more problematic than others. The scenarios were analyzed by reviewing the computer output from UTE 3.0 that detailed the web pages that the respondents visited for each scenario. This computer output was used to identify any common patterns that the respondents used to find the answers to the scenarios. Interviewer notes were then reviewed to identify any issues that the respondents encountered in the process of answering the scenarios.

1 (Disability): Find the 'National Health Interview Survey on Disability'. In what years was the study conducted?

This easiest path to completing this scenario was to click on 'National Health Interview Survey' (NHIS) in the left navigation pane and then click on 'NHIS on disability' from the left navigation pane on the NHIS webpage.

Generally, respondents attempted to complete this scenario by navigating to the NHIS webpage. The first click for eleven of the respondents was the NHIS link in the left navigation pane or the link to the NHIS under 'Surveys and Data Collections Systems'. Most of the respondents who did this first were able to complete the scenario in four clicks or less. Two respondents navigated to the NHIS webpage, but did not see the link on the left for 'NHIS on disability'. One of these respondents said, "The panels on the left side kind of all look the same. You don't know that

you've gone down a level...They looked the same so I probably didn't read as carefully as I should have." This respondent went back to the home page and saw the 'NHIS on disability' link when she returned to the NHIS webpage. The other respondent performed a search on "disability" and was able to find the NHIS on disability webpage from the search results.

The scenario was harder for respondents when they did not navigate to the NHIS webpage immediately. This often occurred when respondents cued in on the word "disability" rather than the whole phrase "National Health Interview Survey on Disability." These respondents would try to identify which survey system would include information about disability. There was a slight tendency for data analysts who were not very familiar with data on disability to make this mistake. Four respondents initially clicked the link to the 'National Health Care Surveys.' Two of these respondents returned to the homepage and quickly navigated to the NHIS webpage. A third performed a search for 'surveys on disability' and found the correct webpage. A fourth respondent clicked on 'D' in the A-Z index and from there clicked on a link for 'disabilities.' This led the respondent to many different CDC websites that were not part of NCHS (e.g. National Center on Birth Defects and Disabilities). Importantly, this respondent was unable to complete the scenario because she was not aware that she was off the NCHS website and hence never attempted to navigate back to the NCHS homepage. One other respondent also used the index and navigated off the NCHS website, but soon backed up to the NCHS homepage once she noticed that the information following the 'disabilities' link from the index was not what she needed.

2 (Ambulatory): Find the 2009 press releases from the NCHS website. Find the January 2009 press release about Ambulatory Surgery in the United States, 2006.

The most efficient route to completing this scenario was to click on 'Pressroom' on the NCHS homepage and find the link to the 2009 press releases in the left navigation pane.

Most respondents were able to find the 'Press Room' link within a few brief seconds. In fact, this was the first click for ten of the respondents. Additionally, all but one of these respondents found the correct press release within three or four additional clicks by clicking on '2009 releases' and navigating to the correct report. One of the respondents clicked on 'Press Release Archives' from the 'NCHS Pressroom' and used the year grid on the 'Press Release Archives' page to find the answer with roughly the same amount of effort as the others. Another respondent clicked on the '2010 Release Schedule' from the homepage, which took him to the 'NCHS Pressroom', and then the respondent accessed the '2009 press releases' to find the report easily like the others who went to the 'NCHS Pressroom'.

Nearly everyone who did not find the 'Press Room' link resorted to using a search feature on the website. Three respondents clicked on the 'Browse/Search Publications' link on the NCHS homepage. Two of these respondents could not find anything referring to press releases on the 'Browse or Search Publications' webpage so they clicked links on the page that were not very helpful. For example, one respondent clicked on 'Publications and Information Products' in the navigation pane and then the link for 'Information Sheets'. She became frustrated and skipped the scenario when none of the web pages she visited were providing useful information. Another

respondent went to the A-Z index on the 'Browse or Search Publications' webpage and did not find any useful information. This respondent eventually navigated back to the NCHS homepage and found the 'Press Room' link and found the press release easily from there. A third respondent actually performed a couple of searches by selecting 'Data Briefs' from the 'Browse List of Publications' drop down box and entering 'press release' one time and 'ambulatory surgery' the other time. The search result below from his second search would have led him to the data brief. However, he did not click on the result even though it was the first on the list.

[National Health Statistics Reports Number 11 January 28 ...](#)

Ambulatory Surgery in the United States, 2006 ... Introduction This report presents data from the 2006 National Survey of **Ambulatory Surgery** (NSAS). ...
www.cdc.gov/nchs/data/nhsr/nhsr011.pdf

It was not clear why the respondent missed the link. The respondent eventually navigated back to the NCHS homepage and clicked on the 'Press Room' link to find the data brief.

Two respondents performed a general search using the search feature on the website. One person admitted, "I'm not too familiar with the press releases." He tried various combinations of searches and finally found the correct press release by entering '2009 press release ambulatory surgery' and clicking on a couple of different results from the list. The other respondent searched for 'press' and did not find what he was looking for. He then went back to the NCHS homepage and followed the 'Press Room' link to find the correct press release. This respondent mentioned that he saw the '2010 Release Schedule' link, but thought that the link was referring to the release of survey data rather than press releases. Hence, he initially ignored everything around that link on the right hand side of the screen.

One final respondent wanted to perform a search, but she was not able to do so because she encountered a problem with the keyboard during the test. She first clicked on 'Public Use Data and Documentation' under 'Data Access'. This did not yield any useful information so she went to the A-Z index. She looked under A for ambulatory, P for publications, and N for National Ambulatory Surgery. She eventually clicked a link from the index that led her to the 'National Hospital Discharge and Ambulatory Surgery Data'. She encountered a message that the page had been moved and she followed the link to the 'National Hospital Discharge Survey.' From there she used the bread crumbs to navigate back to the 'National Health Surveys' webpage and finally followed a link to 'Ambulatory Surgery Centers' which took her to the 'National Survey of Ambulatory Surgery' where the report was opened from the 'What's new' box in the upper right corner of the screen.

3 (Emergency Room): You are writing an article on emergency room visits. What percent of emergency department visits resulted in hospital admission?

As shown in Figures 1-3, this was one of the more difficult scenarios for the respondents to complete. The scenario offered multiple paths to a correct answer. The quickest route to an answer was to click on 'Fastats' and then 'ER visits'. This also turned out to be the most accurate route to the correct answer. Respondents could also find the answer in 'National Health Statistics Report, Number 26'. The results clearly show that respondents in this test preferred to find the actual report that discusses emergency department visits. However, as discussed below, this was

not the most successful route to answer. The results from this scenario showed that the choice of search strategy has a major impact on how likely someone is to find an answer. Furthermore the choice of search strategy is often influenced type of user. Six of the eight respondents who looked for the answer to this scenario on the NHCS website were data analysts. Only one person who was more of a generalist chose this strategy. These respondents tended to prefer either searching or looking for the answer in Faststats.

Only three respondents went to Fastats to find the answer to this scenario. Two of these respondents found the answer within two clicks. A third respondent chose the main topic of 'Injuries' rather than 'Health Care and Insurance' and was not able to find the answer. The respondent then performed a search on 'hospital admission,' which pulled up an irrelevant website on "Preparing for the Next Influenza Pandemic." The respondent finally performed a search on "what percent of emergency department visits resulted in hospital admission," which led him to a report that contained the correct answer.

A more popular strategy was for respondents to look for the answer to this scenario by navigating to the National Health Care Surveys (NHCS). Eight respondents first clicked on 'National Health Care Surveys' to begin this scenario. Importantly, however, only two of these respondents found the correct answer by navigating within the NHCS website. Both of these respondents navigated to 'National Health Statistics Report, Number 26' in the 'What's New' section on the 'Ambulatory Health Care Data' webpage to obtain the correct answer. However, the respondents would probably not have found the report had it not been in the 'What's New' section. It would have taken several more clicks for the users to get to this report under 'Survey Results and Products' on the NHCS website.

Four of the respondents who visited the NHCS website never found the correct answer. All of these respondents were looking for a report or tables where they could find the answer, but they ended up accessing reports that did not provide the correct information. For example, the respondents accessed 'Preliminary Data from the 2008 NAMCS and NHAMCS', 'National Health Statistics Reports, Number 5', and 'National Hospital Discharge Survey: 2005 Annual Summary With Detailed Diagnosis and Procedure Data'. Two respondents began their search for the answer on the NHCS web pages, but navigated to other parts of the website to find the correct answer. For example, one respondent began by browsing the NHCS web pages and then navigated back to the NCHS homepage where he finally found the answer in Fastats. Another respondent clicked on the A-Z index and once she recognized that the link in the index took her off of the NCHS website and onto the CDC website she navigated back to the NCHS homepage. From the homepage, she found the answer in 'National Health Statistics Report, Number 26', which she accessed through a link under 'What's new!'. The respondent commented that this was, "...kind of bizarre because I saw it in the What's new!, but if it hadn't been there I wouldn't have found it...It gave me an answer, but I personally wasn't satisfied with how I got the answer." There were two other respondents whose first click in this scenario was to open up this report from the 'What's new!' section of the homepage.

Other strategies involved using either index or search functions on the website. Two respondents immediately went to the A-Z index at the top of the homepage. Neither of these respondents found any useful information in the A-Z index and both of them eventually found the answer by

performing a search of the website. One of them was led to a report where she found the answer and the other was led to Fastats. Two other respondents initially resorted to either a general search or the “Browse/Search Publications” feature and found the answer in Fastats.

4 (Obese Kids): What percentage of children age 6-11 are obese?

There were also multiple routes to complete this scenario. However, compared to the emergency room scenario, Figures 1-3 show that respondents completed this scenario more quickly and accurately. The answer to this scenario could be found within two or three clicks by navigating to Fastats. More respondents chose to answer this scenario using Fastats than the previous scenario. Respondents also found the answer on a CDC website titled ‘Childhood Overweight and Obesity’ or by accessing a research article titled “Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963-1965 Through 2007-2008” by Ogden and Carroll. Similar to the previous scenario, different types of data users prefer different strategies. All four respondents who looked for the information through one of the surveys were data analysts. Other types of respondents tended to prefer searching the website or utilizing Fastats.

Six respondents clicked directly on Fastats to find the answer. All of these respondents found the answer within a few clicks. The next most popular method for finding an answer was to perform a search or use the index to find an answer. Two respondents used the index. One clicked on ‘O’ and the other clicked on ‘C’ in the index; however, both ultimately clicked on a link that took them to a website on ‘childhood overweight and obesity’. They found the answer easily on that website. Two respondents either performed a general search or a search for publications. Both respondents found the answer in the article by Ogden and Carroll.

Four respondents attempted to find the answer through one of the survey systems. This strategy was only successful for one of the respondents. This respondent was familiar with NHANES and looked for the answer on the NHANES website. He eventually found the article by Ogden and Carroll by clicking on the ‘What’s new’ link on the NHANES website. Three others were unsuccessful finding the information on the NHANES website and eventually found it by navigating back to the NCHS homepage and following links such as Health E-stats or ‘CDC Data & Statistics’ that led them to the CDC website on ‘Childhood Overweight and Obesity’. Another respondent started out by searching life tables from the National Vital Statistics System web page because she was looking for age specific information. She eventually went back to the homepage and actually rolled over obesity in Fastats, but chose not to follow it. She knew that this information came from a survey, but could not remember the name. She eventually skipped the scenario without answering. She was asked why she searched for the information through the survey and not through some other place on the site such as Fastats. She explained, "Because that's where you expect to find that statistic. I'm also looking for some reliable source. Even though I don't mind looking at press releases or some other news item. For me if I have to find the original source. If I can get to the survey or the article where it is published initially that is what I am looking for. News articles and press releases are secondary sources and that doesn't appeal to me." Where she works they publish data supplements, but it is important to know the primary source of the information in case they are questioned about it. Hence, her normal pattern is to get something that’s as close as possible to the original source of the data.

One final respondent thought that a percentage like this might be found under 'Data Access Tools'. She tried several tools such as 'CDC Wonder' and 'Healthy People 2010', but was unable to find the answer. She eventually went back to the homepage and found the answer in Fastats.

5 (Health Data): Find the tabulated data on 'Health Data Interactive'. In 2007, what percent of Medicare beneficiaries, ages 65+, had difficulty in the physical function of walking?

Although Figure 2 shows that this was one of the scenarios that the longest to complete, this is in large part due to the nature of the task. Respondents were able to find Health Data Interactive (HDI) relatively easy. Fifteen of the respondents accessed the tool either via the direct link on the homepage or through the link under 'Data Access Tools'. Respondents also did not seem to have any problems finding the correct answer once they entered HDI. Fifteen respondents were able to find the correct answer. Most of these respondents found the answer without manipulating the table. A handful of respondents used the functionality within HDI to subset the table and obtain the correct answer.

Only two respondents did not find the correct answer. One respondent did not find the answer because they were confused by the wording of the scenario. The table in HDI was divided in institutionalized, noninstitutionalized, and both settings, but the scenario did not specify which setting. The correct answer was found by obtaining the estimate for walking in 2007 from 'both' settings. In any event, this respondent's difficulty was due more to the wording of the scenario than any shortcoming of HDI. The other respondent was not able to complete the scenario due to technical difficulties.

6 (Nutrition Exam): You have received a letter informing you that you have been selected as a participant in the 'National Health and Nutrition Examination Survey'. You are concerned about the legitimacy of the survey and privacy issues. Find the web page that confirms the legitimacy of the survey.

None of the respondents had any difficulty finding the NHANES page that contained this information. Most completed this scenario within approximately 30 seconds. Respondents navigated to the correct page either through the direct link to NHANES on the homepage or by going through 'Surveys and Data Collection Systems'. Once on the NHANES webpage everyone identified the link for 'Selected Participants' in the middle of the screen.

It is notable that none of the respondents used the link for 'Survey Participants' on the NCHS home page. As had been seen with other scenarios, respondents had a strong tendency to navigate to the appropriate surveys website to find the information.

7 (Data Briefs): NCHS publishes 'Data Briefs'. What is the number of the Data Brief on 'Depression and Smoking in the U.S. Household Population Aged 20 and Over, 2005-2008'?

Fifteen of the respondents clicked on the 'Data Briefs' link under 'Publications' in the left navigation pane on the homepage. This link was easy to find for the respondents. The respondents took some time to search the page for the correct data brief, but were generally able to find what they were looking for in a relatively short period of time. However, a couple of the respondents thought that it would be easier to find the data briefs if they were organized by topic.

One respondent also thought that a search function would be useful on the 'Data Briefs' web page. She apparently did not see the 'Browse/Search Publications' from the left navigation pane on the 'Data Briefs' web page. Two respondents actually did choose this route to find the correct data brief.

8 (Health, United States): NCHS publishes an annual report called 'Health, United States'. Find the 'previous reports' of 'Health, United States' available on the website. What is the oldest edition available?

The quickest route to an answer for this scenario was to click the 'Health, United States' link on the homepage and navigate to the 'Previous Reports' using the left navigation pane. Nearly all respondents were able to find the page for 'Health, United States' quickly via the link on the homepage. One respondent accessed the webpage through the 'Browse/Search Publications' feature. One respondent initially went to the index, but went back to the NCHS homepage when she learned that this did not provide any useful information. She then clicked on the 'Health, United States' link.

Most of the respondents were able to find the link to the 'Previous Reports' in the left navigation pane quite easily. Many of the respondents had learned by this point in the test that the left navigation pane was where the most useful links could be found. One respondent explained, "I really like how all of those are listed over there...If there is something listed and the way it is organized by surveys or data - that is always helpful to me." However, there was one respondent who noticed for the first time that the left navigation pane actually changed from page to page. He was used to websites that utilize a static left navigation pane so that the user can navigate the website more easily. The respondent also noted that he was somewhat frustrated that he often had to use the 'Back' button on his browser to return to places he had visited. He would have preferred to have a static menu that allowed him to navigate the website more easily.

9 (Data Center): You want to perform an analysis of data from NCHS that requires the use of restricted variables. You need to write a proposal to the Research Data Center to conduct this analysis. How long does the proposal review process take?

The most efficient route to answering this question was to click on the 'Research Data Center' link under 'Data Access' on the homepage. From the Research Data Center's (RDC) website, the respondent could click on the 'Proposal Process' in the left navigation page or boxes in the middle of the screen. Respondents were generally able to find the RDC website, but some users

thought that it needs to be more clear on the website how to access information on “restricted variables” since many visitors might not be familiar with the RDC.

Although many respondents were unfamiliar with the Research Data Center (RDC), it was fairly easy for most of them to find. Twelve of them accessed the RDC website by clicking on the link under ‘Data Access’ on the NCHS homepage. Two others performed searches. One searched for “Research Data Center” and followed a link that took her to the correct page. This respondent thought that most people who are interested in using restricted variables might not know about the RDC so she performed an alternate search on ‘restricted variables’ and was taken to a webpage that described restricted variables. This web page had a link to the ‘Proposal Process’ in the left navigation pane where the respondent would also have been able to find the answer. The other respondent searched immediately on “restricted variables” and followed a link to webpage on the ‘types of restricted variables’ where she followed a link on the ‘Proposal Process’ to find the answer to the scenario.

Two other respondents initially clicked on ‘Public Use Data and Documentation’ under ‘Data Access’ on the homepage. They both generally followed links to the ‘Data User Agreement’ and ‘Data Release Policy’. One clicked on a hyperlink for ‘data use restrictions’, which took the respondent to the ‘Data User Agreement’. Importantly, they did not find any links to the RDC or other relevant web pages in this section of the website. Hence, both of them navigated back to the NCHS homepage and eventually followed links to the RDC to find the answer.

The wording of this scenario cued many respondents in to search for a link to the RDC. The results from the test demonstrate that it is probably harder for someone to find this type of information if they are not familiar with the RDC as most respondents indicated that they are not. It is encouraging that the search engine produced useful results, but it might be more useful to have more educational information about restricted variables on the NCHS homepage and other appropriate locations on the website.

10 (Release): Find the 2010 Release Schedule.

The quickest route to answering this question is to click the ‘2010 Release Schedule’ link on the far right of the NCHS homepage. The respondents could also navigate to the release schedule by first visiting the ‘Press Room’ and clicking on ‘2010 Release Schedule’ from there.

Although everyone was able to find the release schedule, there is some ambiguity around the phrase “Release Schedule” that affected this scenario. The ambiguity may also affect how people view the phrase and use the link on the website. When a few of the respondents encountered this phrase they immediately associated it with “data releases”. However, the link on the website refers to “press releases”. This interpretation affected at least three of the respondents in the test. All three went immediately to the sections of the homepage that included the word data (e.g. links under Data Access in the left navigation pane). Two of them spent a considerable amount of time visiting web pages that follow the link ‘Public Use Data and Documentation’. One of these respondents explained that most users associate this with data. Another respondent said, “I’m not really sure what it’s asking. 2010 release schedule for what?” All three eventually found

the correct link, but it was never really clear that they understood that this scenario was referring to press releases.

11 (Q-Bank): You are interested in finding question evaluation results about questions on the topic of health. Find the link for 'Q-Bank Question Evaluation Reports.' How many population based questions about the topic of health can be found in Q-Bank?

The most efficient route to answering this scenario was to click the 'Q-Bank Question Evaluation Reports' link on the homepage. Respondents would then click the 'Question Topic' search on the left of the Q-Bank web page. Finally, the respondents would need to select population as the 'Survey Type' and select health as the 'Question Topic.'

Q-Bank was generally easy for most respondents to find. Most of them accessed Q-Bank through the link to 'Q-Bank Question Evaluation Reports' on the NCHS homepage. Five respondents had to search for Q-Bank. Nearly all of the respondents were unfamiliar with Q-Bank. Several of the respondents uttered words like "What is Q-Bank?" or "I've never heard about the Q-Bank, I'm going to be honest" at the outset of the scenario. The respondents' behavior on the Q-Bank website also provided evidence that they were completely unfamiliar with the purpose of the website. Most of the respondents browsed the FAQs and/or the article on "Q-Bank: Development of a Tested-Question Database" in order to gain some understanding of the purpose of Q-Bank. After some time exploring the website, nearly all of the respondents were able to find the 'Question Topic Search' to answer the scenario.

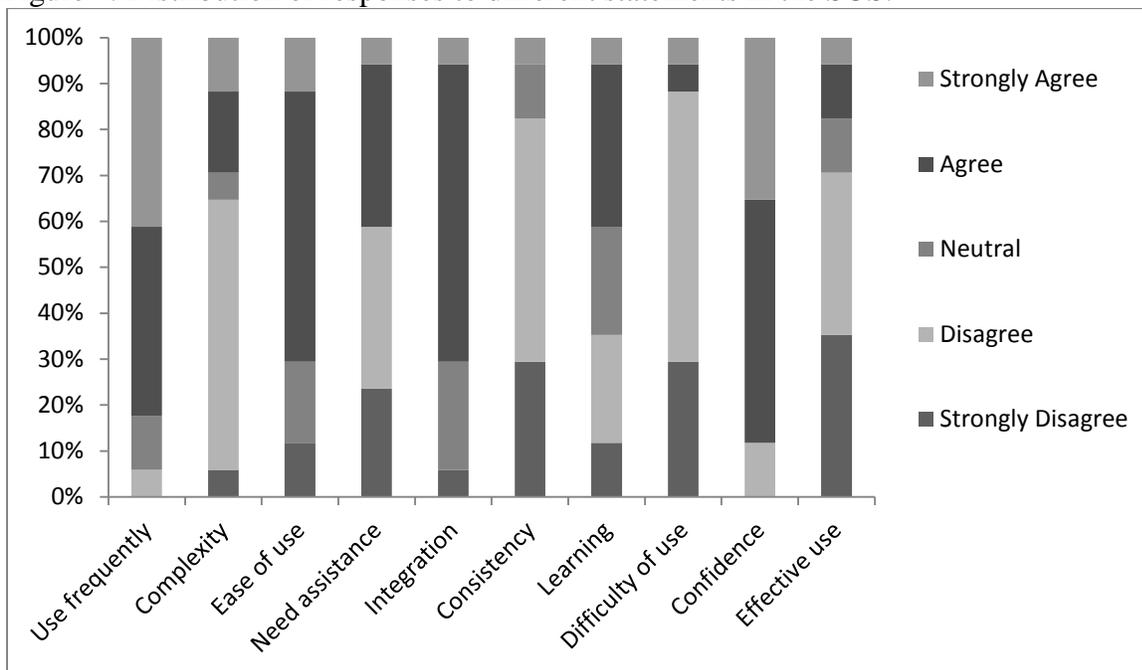
The drop-down menus on the question topic search were not very intuitive for the respondent and this created a usability problem. First, the menus were all blank when the respondents entered the question topic search screen. The respondent must select the first drop down box which indicates whether the user is searching for questions from population based or establishment based surveys. However, most respondents did not appear to be very familiar with this terminology or even understand why this is necessary. There are some instructions for the user to select population or establishment just above the drop-down boxes; however, it did not appear that the respondents paid any attention to them. Therefore, it would be useful to re-design the question topic search to better accommodate this functionality. It would be better to incorporate 'Survey type' more directly into the experience of the users rather than relying on them to read the instructions on the screen. For example, a question on the screen could ask, "Would you like to search for questions about persons or organizations?" Then based on the answer to this question the appropriate search menus would appear.

Last, many of the respondents were specialized in a particular survey system on the website. However, there are rarely any links to Q-Bank from the individual survey system web pages.

System Usability Scale Satisfaction Scores

Once all of the scenarios were completed the respondents completed a series of questions that make up the System Usability Scale (SUS). The SUS scale is a frequently used quantitative measure to help understand the usability of a system. The respondents are asked to indicate their level of agreement with ten different statements on a scale from strongly agree to strongly disagree. The scores are then combined using an algorithm to obtain an overall SUS score. Overall SUS scores can range from 0-100. Scores higher than 70 are considered above average, scores between 65 and 69 are considered average, and scores below 60 are considered as low satisfaction. The over SUS score for the NCHS website during this test was 67.8 indicating average satisfaction among the respondents in this study. Figure 4 illustrates the distribution of the responses to each statement in the scale.

Figure 4. Distribution of responses to different statements in the SUS.



(Use frequently) I think I would like to use this website frequently.

Nearly all of the respondents either agreed or strongly agreed with this statement. Most of the respondents who answered agree or strongly agree are already using the website almost daily to either download data or find other information from report. Hence these respondents took this as an opportunity to express that they currently visit the website frequently. Many expressed that the website acts as a clearinghouse for important data that they need to use in their job.

Two respondents answered neutral to this question, but this really meant that the question does not apply to them. These two respondents emphasized that they use the website for a particular purpose which is typically to download data for find some information that they need for

analysis. In other words, their use of the website depends on the particular needs of the respondent at a particular time.

One respondent disagreed with the statement mainly because he does not use the website enough to know everything that is on it. He thought there is a lot of information on the website and it “feels like the information is all up there in a mess.” He also mentioned that there needs to be something on the website that explains who NCHS is, what they do, and what surveys they put out. The respondent often works with BRFSS data and thought that website was easier to get around on. He was not sure if BRFSS was related to NCHS or not. This respondent’s concern relates to the more general theme of needing to educate NCHS website visitors about the agency and the data that it collects.

(Complexity) I found the website unnecessarily complex.

Only a few people agreed with this statement. One respondent was not very familiar with the website and thought that the organization was confusing. He viewed the website as being organized into surveys, publications, and data with everything else scattered throughout the website. He thought that it would be more useful to have information up front that discusses the purpose of NCHS and what surveys they conduct. He saw the link to the different surveys on the homepage, but noted that there were no definitions of the surveys. Hence if someone was not familiar with the content of the surveys they might get frustrated. He was also confused about why many of the publications that come from different surveys could not be found on the relevant survey pages. They were often found on different sections of the website with various publications.

A couple of the other respondents also agreed, but provided the caveat that it was not *unnecessarily* complex. They pointed out that there is a lot of information on the website and that there was going to be some complexity for that reason. Similarly, a number of respondents disagreed for the very same reason. In addition, the respondents often acknowledged that they encountered problems during the test, but this was often because they were entering a section of the website that they did not have experience with. For example, one of the respondents visits the NHANES webpage daily and is very familiar with that, but he is not so familiar with other sections of the website. Respondents also generally clarified that they believe that the website is intended for researchers and surmised that the average person in the public would have difficulty finding information on the website.

In short, the vast majority of respondents generally felt that the website was complex, but not *unnecessarily* complex given their familiarity with the different sections of the website and the intended audience. However, if the website is intended for a broader audience than researchers and these assumptions are incorrect, then it might be necessary to provide more general information about NCHS, its purpose, and its surveys on the homepage.

(Ease of use) I thought the website was easy to use.

Many of the same sentiments expressed in response to the last statement were also expressed with this statement. Two respondents strongly disagreed with this statement. One of these

respondent mentioned that the index at the top of the screen “takes up a lot of real estate” and is not useful. We encountered this issue several times in different scenarios during the test. The index often led the respondents to websites that were not useful and sometimes took them completely off of the NCHS website with no clear path to return. This respondent also was confused by how the left navigation pane changes at different levels within the website. He did not notice this until he had completed several scenarios. He was used to this staying more or less static in websites and ignored it for that reason. This is problematic because most respondents found that the left navigation pane provided the most useful links for finding information.

The majority of respondents agreed with this statement. However, their agreement was once again met with several qualifications. Most acknowledged that the website works well for researchers who visit the website for a specific purpose (e.g. downloading data or reports from a specific survey). Some considered themselves as generalists and hence they often spent a lot of time searching for information on the website because they are not able to familiarize themselves with any one part of the website.

Consistent with a point raised earlier in this report, some respondents thought that the website needs more of an educational tone for less sophisticated users. Some thought the website is useful for Federal employees and others in the professional community who are more sophisticated, but less useful for groups like students. A couple of the respondents thought that NCHS might want to consider separate websites for groups like students or legislators or at least provide some guidance on what can be found on the website for these groups. Elsewhere, a professor mentioned that she would like to list NCHS as data resource for her undergraduate students, but thought they would have significant problems find data on the site.

One respondent who agreed with the statement thought that the site was generally easy to navigate and the search function was effective. However, she did not strongly agree because certain information was sometimes hard to find. For example, she thought that there was some ambiguity about what agency the data comes from. She thought it would also be good to have easily accessible information about new data, who is collecting it, and what methods they are using to collect it. In addition, she thought it was sometimes hard to tell what is included under certain link. She thought that the site needs a flow chart or website map and would also benefit from pop-ups that would appear when someone rolled over a link to explain what could be found under the link.

(Need assistance) I think I would need help sometimes to be able to effectively use this website.

Respondents interpreted the need for help in a few different ways. Help could mean using a help function, needing to search, calling for help, or e-mailing for help. Some who agreed with this question had actually needed to call or e-mail NCHS for help finding information in the past. One respondent admitted that there is some information (e.g. state level estimates) that is harder to find and she occasionally needs to call for help to find. Another respondent who had a difficult time find the answers to some of the scenarios said that he probably would have given up if he were looking for the information on his own. However, if the information was important he would have called to figure it out.

Most of the respondents who disagreed generally thought that the features were available on the website to find the information they needed and that it was just a matter of having the time to find the information. For example, one respondent discussed that she would just take the time to figure out where the information is located and that this is how she typically learns to use websites. This respondent thought that a tutorial on the website about where everything is located might be helpful. Another respondent, who disagreed with the statement, discussed how she could not find something on the NCHS website in the past and then resorted to a Google search to find what she needed.

(Integration) I found that the various functions in this website were well integrated.

Several respondents were confused by this statement. All four respondents who answered neutral to this question explained that they did not know how to answer. Many respondents did not have clear understanding of what was meant by “various functions” or “well integrated.”

Only one respondent disagreed with the statement. He did not understand why the data was often separated from information about the survey. He thought that all relevant information about a survey should be found on one screen and not scattered throughout. He also noted that the term “release” on the homepage was used for different information. It sometimes referred to press releases and other times referred to the release of publications or data releases.

Everyone else agreed with the statement even if they were not exactly sure what it was asking. Most of the respondents interpreted this as asking about how well the information on the website was organized. For example, several talked about how the information on the site is organized surveys, publications, and data like in the left navigation pane. Only one respondent strongly agreed and the others just simply agreed. This is because most of them liked the general organization of the website, but could think of aspects of it that they did not like. One respondent mentioned that she thought she should be able to find the press releases by searching for publications, but was unable to do so. Another respondent thought it would be useful to have an A-Z index for publications similar to the one on the site that generally includes diseases and conditions.

(Consistency) I thought there was too much inconsistency in this website.

The answers provided to this statement were very similar to those provided to the previous statement. Generally thought that consistency referred to whether links were consistent with the information that followed, terminology was used consistently, or menus were used consistently.

Only one respondent agreed with the statement. He pointed out that the menu in the left navigation pane changes at different levels of the website causing him to overlook the placement of important information because he expected that menu to stay the same. He also pointed (as he did at the previous statement) that they term “release” is used to refer to different types of information.

The rest of the respondents disagreed with the statement. Some just simply indicated that they thought this question was asking the same thing as the previous question. Others mentioned that

the information on the survey pages is generally consistent across surveys. For example, there are usually links to data sets, questionnaires, and publications regardless of the survey and these groupings seem logical. One respondent pointed out that the Q-Bank website was an exception. She was not familiar with Q-Bank and it just seemed out of context. She had a hard time understanding some of the language on that website.

(Learning) I would imagine that most people would learn to use this website very quickly.

Respondents were split fairly evenly on their reactions to this statement. The answer to this question depended on how the respondent defined “most people.” Respondents were generally in agreement that people such as researchers, epidemiologists, programmers, and data analysts would learn to use the website quickly. Several indicated that they were thinking about these groups of people when responding to this statement. Respondents also agreed that the general public would have a hard time learning the website. In addition, several respondents pointed out in their answer to this question assumes that the statement is referring to people with basic knowledge of the Internet and computers.

(Difficulty of use) I found this website very cumbersome to use.

Due to time we were unable to do extensive probing on this question; however, by this point in the interview the SUS questions were revealing redundant information with the previous questions. Only two respondents agreed with this statement. One of these respondents mentioned how it was difficult to know everything that was on the website, because there really is nothing on the home page providing general information about NCHS and its surveys. He also mentioned the bread crumbs were sometimes inaccurate, because he noticed one time that the bread crumbs showed that he was two pages back from where he thought he actually was. Everyone else disagreed with the statement and basically mentioned how they could find the information that they needed relatively easy given the vast amount of information on the website.

(Confidence) I felt very confident using this website.

This question was not extensively tested due to time. Only two respondents disagreed. As one of these respondents mentioned in response to a previous question, he thought that it would take a lot of effort to find much of the information in this test on his own. Everyone else agreed with the statement. We did not get much detail from the respondents about their answers to this question. Respondents mainly just offered a vague sense that they could find what they needed to find on the website.

(Effective use) I will need to learn a lot about this website before I could effectively use it.

A majority of respondents disagreed with this statement. This question really doesn't apply to those who use the website frequently. They often answered strongly disagree because they use it so much and are familiar with the site. Others who disagreed with the statement mentioned that they can basically get what they can effectively get what they need (e.g. data) from the website. They are aware that they could be doing more with the website, but would just need to spend some more time on the website to learn how to use some of the other features.

Use of Social Media for Information about NCHS Products

We asked respondents the following question at the end of the test:

NCHS uses social media such as Twitter and Facebook to announce the release of NCHS products. How likely are you to use this technology to learn about NCHS products?

Only two respondents were very likely to use, one respondent was somewhat likely, eleven respondents were not very likely, and three respondents were not likely at all to use social media. Even those who were likely to use mentioned that it should be tailored to particular needs so that people only view the information that is relevant to them. For example, one respondent mentioned that he was only interested in learning about data releases and another mentioned that he was really only interested in NHANES. Two of the respondents who were likely to use social media already use Facebook to look for CDC updates.

The overwhelming majority of the respondents were not very likely to use social media for this purpose. Some respondents mentioned that they already are subscribed to NCHS listserves and find this to be convenient. Others simply check the website for update. Another problem with social media is that a number of respondents mentioned that their workplace blocks them from visiting this type of website.

Appendix A: Research Protocol

Practice Scenarios: Start at <http://nationalzoo.si.edu/animals>

P1 About how many animals are in the National Zoo?

500
1000
2000
3000

P2 Find the link to the Giant Pandas.

Scenarios: Start at <http://www.cdc.gov/nchs>

1 (Disability): Find the 'National Health Interview Survey on Disability'. In what years was the study conducted?

1985-1986
1989-1990
1994-1995
1998-1999

2 (Ambulatory): Find the 2009 press releases from the NCHS website. Find the January 2009 press release about Ambulatory Surgery in the United States, 2006.

3 (Emergency Room): You are writing an article on emergency room visits. What percent of emergency department visits resulted in hospital admission?

10%
13%
17%
20%

4 (Obese Kids): What percentage of children age 6-11 are obese?

20%
22%
26%
30%

5 (Health Data): Find the tabulated data on 'Health Data Interactive'. In 2007, what percent of Medicare beneficiaries, ages 65+, had difficulty in the physical function of walking?

- 28.2%
- 36.8%
- 47.9%
- 65.6%

6 (Nutrition Exam): You have received a letter informing you that you have been selected as a participant in the 'National Health and Nutrition Examination Survey'. You are concerned about the legitimacy of the survey and privacy issues. Find the web page that confirms the legitimacy of the survey.

7 (Data Briefs): NCHS publishes 'Data Briefs'. What is the number of the Data Brief on 'Depression and Smoking in the U.S. Household Population Aged 20 and Over, 2005-2008'?

- 40
- 34
- 22
- 11

8 (Health Stats): NCHS publishes an annual report called 'Health, United States'. Find the 'previous reports' of 'Health, United States' available on the website. What is the oldest edition available?

- 1990
- 1985
- 1980
- 1975

9 (Data Center): You want to perform an analysis of data from NCHS that requires the use of restricted variables. You need to write a proposal to the Research Data Center to conduct this analysis. How long does the proposal review process take?

- 1-2
- 3-5
- 6-8
- 9-12

10 (Release): Find the 2010 Release Schedule.

11 (Q-Bank): You are interested in finding question evaluation results about questions on the topic of health. Find the link for ‘Q-Bank Question Evaluation Reports.’ How many population based questions about the topic of health can be found in Q-Bank?

515
635
791
921

System Usability Scale

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I think I would like to use this website frequently.	1	2	3	4	5
I found the website unnecessarily complex.	1	2	3	4	5
I thought the website was easy to use.	1	2	3	4	5
I think I would need help sometimes to be able to effectively use this website.	1	2	3	4	5
I found that the various functions in this website were well integrated.	1	2	3	4	5
I thought there was too much inconsistency in this website.	1	2	3	4	5
I would imagine that most people would learn to use this website very quickly.	1	2	3	4	5
I found this website very cumbersome to use.	1	2	3	4	5
I felt very confident using this website.	1	2	3	4	5
I will need to learn a lot about this website before I could effectively use it.	1	2	3	4	5

Social Media

NCHS uses social media such as Twitter and Facebook to announce the release of NCHS products. How likely are you to use this technology to learn about NCHS products?

Very likely
Somewhat likely
Not very likely
Not likely at all