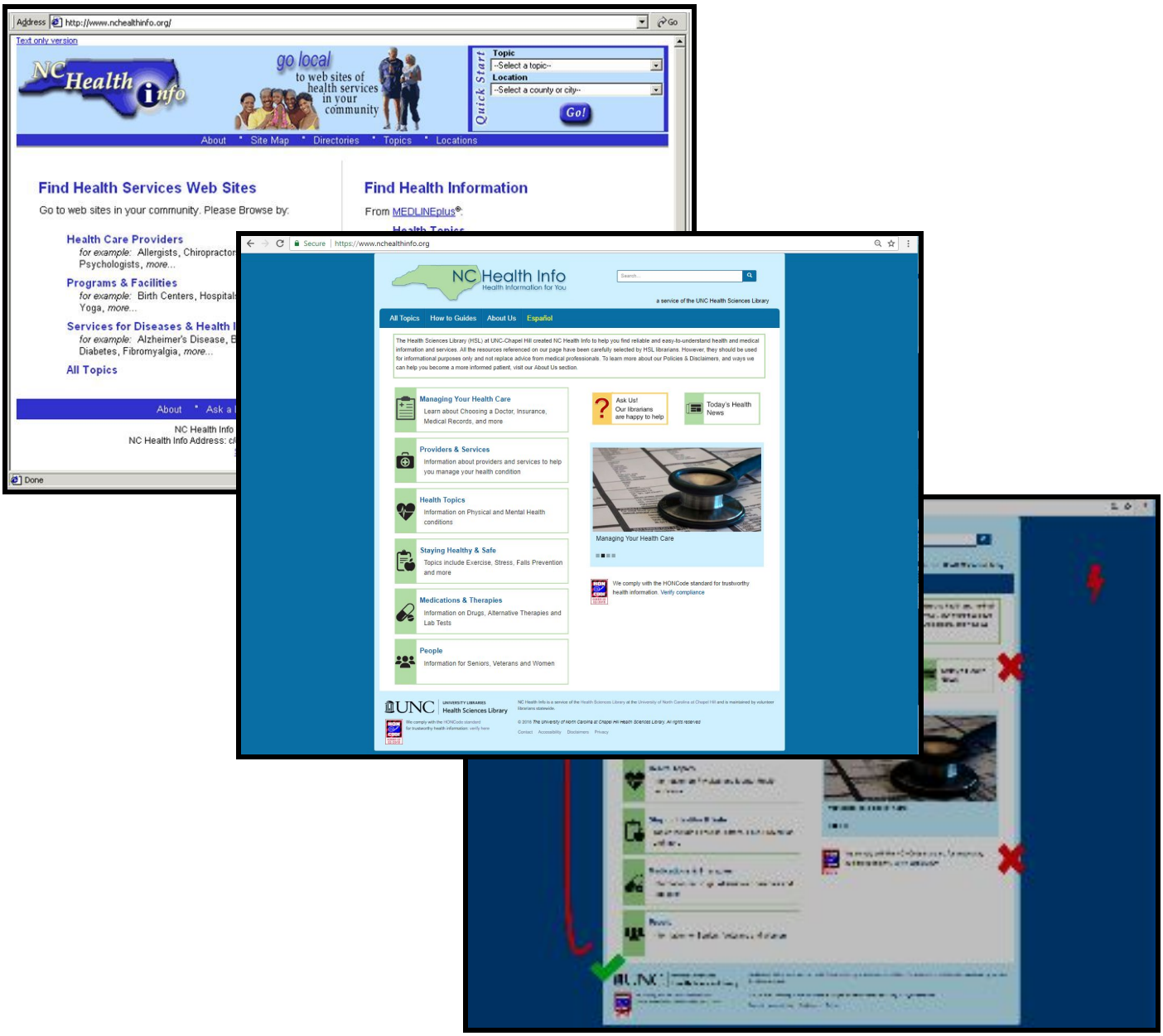
INLS 718 | User Interface Design | Spring 2018

School of Information and Library Science, University of North Carolina at Chapel Hill

Final Report submitted to Dr. Fei Yu

User Interface Design Assessment

nchealthinfo.org



Submitted by

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Part 1 : Conceptual Model

System Scope and Goals

NC Health Info (NCHI) is Health Sciences Library's consumer health website, an online guide to websites of quality health and medical information for the public. NCHI has reliable, easy-to-use information about health insurance, choosing a doctor or health care service, getting a second opinion, and electronic health records to help consumers become more informed patients and better at navigating the healthcare system.

NC Health Info also links to curated information about health conditions, mental health disorders, drugs and pharmaceuticals, and treatments and procedures. The Providers & Services section offers information on how to manage a specific health condition, what type of providers treat that condition, and links to directories of names and contact information of specific providers, searchable by location.

This website has been created specifically for North Carolina residents, but is also accessible by anyone looking for information. While some information will be generic in nature, some will only be applicable to North Carolina, like information about *NC Licensing Boards*.

Users of all age can use this website to find information on medical concerns. Although the user base in not specific, the website's primary target user group is one with an average education level rather than the highly educated user who does not have specialized medical knowledge. It also serves as a secondary resource that medical professionals can direct their patients to in addition to the information that the patients receive from their doctor and the hospital. This could be information about pharmacies, insurance, providers, etc.

In addition to the English speaking user, NCHI also provides an option to switch to Spanish to cater to the Spanish speaking user.

Part 2 : Users

[2.1] USER GROUP DESCRIPTION

The health care system and health information is often complex and confusing. Users of the NC Health Info website are typically those who turn to searching the web for answers to their health questions and often it will be in search of symptoms or diagnosis help before they contact a health professional or in some cases, in lieu of seeing a doctor. Research has also shown that relatively few health information seekers make note of the currency of the information found or the authority or reliability of the source of that information. We would like our website to be a reliable source of information.

Users of the NC Health Info website visit the website seeking health information on their condition or disease in English or Spanish such as treatments and procedures or medications. Typically users also want to learn about health insurance, choosing a doctor and other information on navigating the health system. A large group of users are interested in managing their health care, finding preventive health and wellness information and locating local providers and services in North Carolina. Further, they also want to learn how to evaluate health information found on the web. Overall the users want to become more informed so they can be an active participant in their health care.

The age group of users ranges from teens to older adults. Research has shown that many women are the caregivers for their family's health, so many of our users are female. Users are generally those that seek out information to be proactive and informed. This cluster is identified as the primary user group.

In general, the users have no defining physical characteristics, although older users might want larger fonts for easier viewing. The users have a wide range of social characteristics, including education and income levels. They may speak English as a second language, they may be librarians helping patrons to locate North Carolina-specific health information or services, or they may land on our site after searching google with keywords such as health and NC.

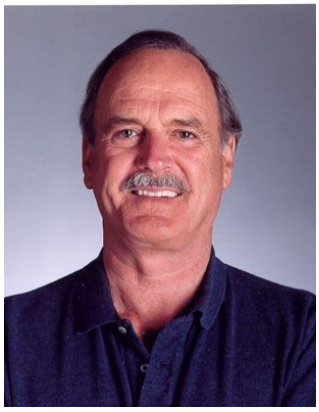
In general, our user group is made up of literate adults and those comfortable using the Internet to access and utilize health information. Most are capable of reading text-heavy pages, but we'd like to appeal to a broader spectrum of health consumers, most notably those with low health literacy. We'd also like more sections to be less text-heavy and have more white space, easier to read and understand information.

The users are generally comfortable searching google and navigating the Internet. Most users do not have specialized health knowledge and may use the more commercially known website, WebMD or google when searching for health information. They may also not be aware of how to evaluate the information they find and may be vulnerable to inaccurate or misleading health information claims.

Users are motivated to seek out information to help them manage their illness or to know where or when to seek professional help. Our website provides an anonymous way to look for health information, but it's also advantageous for a health consumer or health information seeker to use an interactive site that provides information tailored to their information need.

[2.2] USER PERSONAS

Primary User Persona 1 : Arthur[1]



- **Name**: Arthur
- **Age**: 65
- **Occupation**: Retired Bank Clerk
- **Home Life**: Lives with his wife who is 64 years old.
- **Education**: High School
- **Work Environment**: Retired
- **Home environment**: He likes to spend his day reading, watching the news and tending to his vegetable garden. His son lives a few miles away. He has a 5 year old grandson who he baby sits three days of the week while his son and daughter-in-law are at work.
- **Computer Proficiency**: Can operate a computer and use the internet to check emails and do some basic search using Google.
- **Background in health related information**: Arthur does not have any specialized medical knowledge. He is only familiar with some basic things from his experience of day to day illnesses.
- **Motivation**: Arthur and his wife are old, and they often have minor medical issues which they don't want to go to the doctor for unless it is critical. He also babysits his grandson, who is a naughty child and also keeps falling ill with colds and stomach aches. For these monir things, Arthur prefers to look for information himself rather than refer to a medical professional
- **Information-seeking habits and favorite resources**: Being an old-school kind of person, Arthur used to prefer asking his friends, family and peers first for any information that he needs. The last couple of years though, he has started using the internet to look for information since that saves time and provides information instantly. He has no specific source that he uses for medical information but would really like to have one go-to source because the internet is full of so many options that it sometime leaves him confused.
- **Goals:** Arthur wants to be able to look after himself and his family (primarily his wife and grandson) when it comes to regular medical issues. He does not like to go to the doctor for things unnecessary things.
- **Quote**: "I need to know where to look for information. But how do I get to know that? People should make their resources more visible !"

[1] Photo Credit

Primary User Persona 2 : Julie[2]

- **Name**: Julie
- **Age**: 36
- **Occupation**: Stay-at-home mother
- **Home Life**: Married, mother of two children, ages 11 and 13
- **Education**: Some years in community college (incomplete)
- **Work Environment:** Jeanne is a homemaker so she stays at home engaging in her personal pursuits.
- **Home Environment**: Jeanne stays home where she focuses on raising her two children and making sure they are healthy.
- **Computer Proficiency**: Jeanne uses the Internet daily and is comfortable searching through Google, but does not know technical utilities such as wildcard operator or boolean search. She is capable of serendipitous search.
- **Background in health related information**: Jeanne has no knowledge of medical jargon, though she is familiar with specific issues based on her own personal experience. However, she does not enjoy having to look up what words mean and prefers layman terms to understand health-related issues and explain them to her children.
- **Motivation**: Jeanne wants information that can be easily translated back into layman terms. As such, she is often impatient when looking through long chunks of text and is more prone to misinformation. She wants to make sure that her children's health is prioritized and wants to learn best practices to keep them healthy.
- **Information-seeking habits and favorite resources**: Jeanne overwhelmingly uses online searches, particularly using Google, in order to find articles about health-related issues. She avoids reading long blocks of text, but is perfectly capable of doing so when she has time available.
- **Goals**: Jeanne wants to learn more about health-related resources to better raise her children.
- **Quote**: "I want to make sure I'm treating the kids properly"

[2] Photo Credit

Secondary User Persona 1 : Maria[3]

- **Name**: Maria
- **Age**: 51
- **Occupation**: Housekeeper
- **Home Life**: Maria is a single woman, and lives with her 23 year old nephew
- **Education**: High School
- **Work Environment**: Maria is a housekeeper and works for five days a week.
- **Home Environment**: At home, Maria takes care of herself and her nephew. After returning from work every evening, she cooks dinner and spends quality time with her nephew. She loves to spend time interacting socially and her recent introduction to social media also takes up some time. On weekends she meets her friends and neighbours.
- **Computer Proficiency**: Maria is not very technology-savvy. She did not have a smartphone or a computer till a few years ago. But ever since her nephew came to live with her 4 years ago, he has been trying to teach her to use the computer. She is now fairly comfortable in using Google to search things of her interest. She also has a social media profile that she uses to interact with friends.
- **Background in health related information:** Maria is not a medical professional herself, so she has limited knowledge about medicine. Whatever she knows is through her experiences.
- **Motivation**: On her social media, Maria is part of a group of the neighbourhood women who share information about everyday things. They also ask each other for information regarding everyday life, like which is the best place to get pizza, ideas for any upcoming festival, or when someone falls ill they ask for advice.
- **Information-seeking habits and favorite resources**: Since Maria is not very well conversed with the internet, she explores a lot and ends up getting information from multiple resources. She would like to know which ones are reliable resources so that she can stick to those resources.
- **Goals**: Maria likes to be able to help people when they need information, and from her experience she is able to give some advice on things she is familiar with. She would like to be able to share more information and hence now uses the internet to look for information.
- **Quote**: “I should be able to give the right advice when seeked!”

[3] Photo Credit

Secondary User Persona 2 : Jason[4]

- **Name**: Jason
- **Age**: 27
- **Occupation**: Jason is a nurse at the city hospital
- **Home life**: Jason lives with a friend and visits his family over the weekends
- **Education**: Bachelor of Science in Nursing
- **Work Environment**: Jason is just fresh out of undergrad and new to the work environment. At this point he shadows his senior to understand his responsibilities. Some patients approach him when they have any questions. He is generally able to answer their queries, but when he is not sure, he consults his senior and is able to get most of the answers.
- **Computer Proficiency**: Jason is very comfortable using the computer and the internet.
- **Background in health related information:** Jason is a medical professional and hence hols specialized medical knowledge.
- **Motivation**: Jason is a nurse, and has knowledge of medicine, but he still likes to learn beyond what he has learnt in undergrad and in studies. He tries to acquire knowledge from his seniors, peers and from the internet. He hates it when he is not able to help a patient with a concern or a question. He has a curious nature and loves to explore for information by himself instead of asking too many questions. He is always ready to help the people he comes in contact with, to find answers to their health questions.
- **Information-seeking habits and favorite resources**: Jason tends to look for answers by himself. But at work he prefers to first consult his senior in the interest of time. But when he does have the time, he prefers to look for information by himself. He explores the internet for new and different websites where he can get a more wide range of information.
- **Goals**: Jason wants to be the Head Nurse in the hospital that he is working at. He also wants to be the go-to person for his neighbourhood for basic healthcare related questions.
- **Quote**: “There is so much out there to learn! ”

[4] Photo Credit

Part 3 : Tasks

USER TASK ANALYSIS

Based on initial user group descriptions and discussion with the stakeholders, the team identified the following four main tasks that users will engage in, on the NC Health Info website.

- **Task 1** Seeking information about *disease* (such as symptoms, medicines and treatments)
- **Task 2** Seeking information about *providers* (such as healthcare providers, pharmacists, procedure providers)
- **Task 3** Seeking information about *insurance* (such as buying insurance, using insurance)
- **Task 4** Seeking information about *preventive health* (such as immunizations, well-being, exercise etc.)

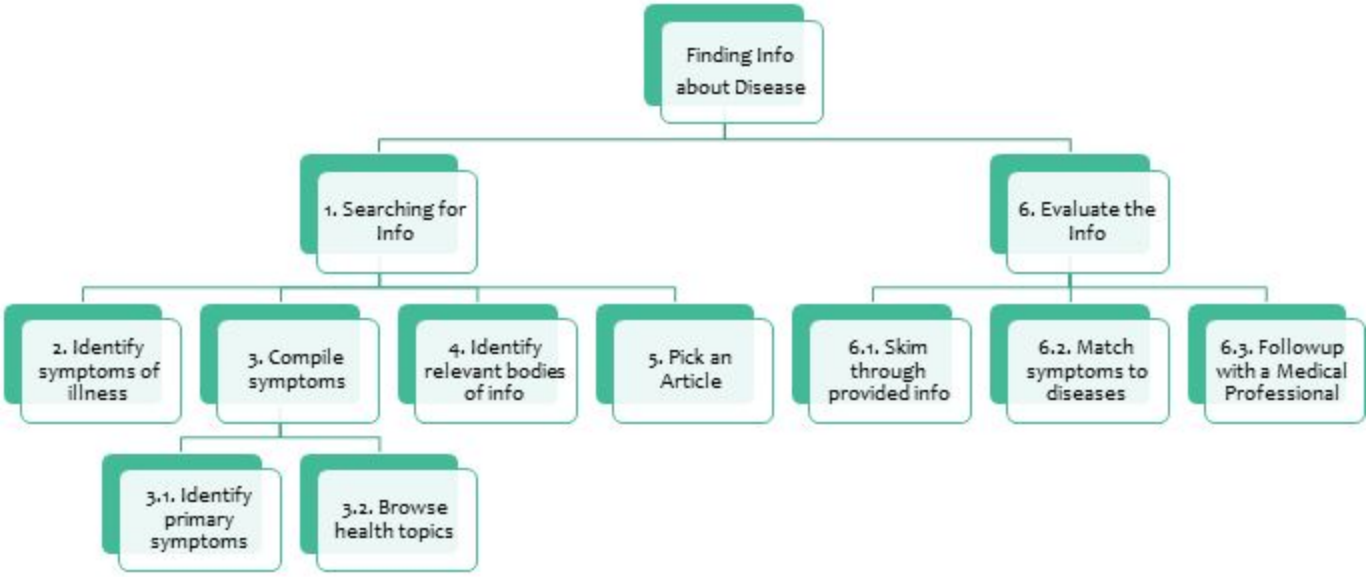
For each of these tasks, we have charted out a detailed task analysis, that includes the following

- Hierarchical Description of the task
- Essential Use Cases
- Scenarios of Use
- General Description of the Task Characteristics

TASK 1 : Seeking information about disease

Hierarchical Description

The following diagram is a hierarchical description of this task



Essential Use Cases

The following tables summarises three essential use cases arising out of the above task descriptions. The essential use case distinguish between which steps will be carried out by which entity, i.e. which steps will be carried out by the User and which steps will be carried out by the System.

Finding Information	
User Intention	**System Responsibility**
Find information on diseases	
	Provide categories with illness information
Choose interested category	
	Obtain information
Browse for relevant text	

Evaluating Information	
User Intention	**System Responsibility**
Evaluate information	
	Provide anchor text, links, information
Browse through information	

Follow Up	
User Intention	**System Responsibility**
Evaluate information	
	Provide anchor text, links, information
Browse for medical connections	
	Provide a reliable course of action
Follow through on actions	

Scenarios of Use

- **Finding Information:**
    - Jeanne noticed that her youngest child has started to heat up and might be ill. She notices that he has a stuffy nose, his face is turning red and he is extremely lethargic. She uses these symptoms to search for medical information on the NC Health Info website, but notices that the search function does not work for queries such as “stuffy nose” so she browses for topics based on her experience. She believes that her child might have the common cold, but also that he’s unnaturally chilly to the touch.
    - She still wants to get a medical checkup just in case the illness is actually worse than it appears to be right now.
- **Evaluating Information:**
    - Jeanne browses the NC Health Info website based on the categories provided and locates several topics such as Flu and Contagious illnesses which she believes fits the bill. She clicks through similar links based on her experience and notes resources such as healthcare providers, medicines to reduce symptoms and courses of actions to take.

    - Jeanne specifically searches for stuffy nose and lethargy as being the primary symptoms because she is not aware of any other terminology or jargon that would help substantiate her queries.
    - She tosses aside all other categories that do not mention these symptoms, helping her narrow down the culprit. Once she's satisfied with the collection of perceived relevant bodies of information, she looks through each one to see if it matches the symptoms of her child's.
- **Followup:**
    - Jeanne uses the information that she's learned in order to make a more informed (but not certain) medical decision – if she is assured that her child only has the common cold, she could take care of him with home remedies and proper care and hygiene. However, she sometimes feels that the symptoms she finds are only a fragment of bigger problems so she feels inclined to find a medical professional to get her child checked. She continues to look through the list to see if there's anything else she's missing.
    - She then uses her judgement on whether or not what medical professionals from her list of relevant information will provide her with the help that her child needs.

General Description of Task Characteristics

Users typically do not perform this task often as illnesses occur periodically, with some such as the common cold occurring more frequently than others such as diabetes or reflux. When the user needs to perform the tasks, however, they will be done many times to substantiate their need to understand their medical problems holistically. The nature of the website's structure is biased towards browsing rather than searching so users may find that they spend more time rummaging through unnecessary information than relevant topics. While these users generally do not have unreasonable time-constraints, they do become easily frustrated and will turn to another source if they believe that their efforts are not being rewarded effectively. Unfortunately, browsing frequently does this, especially in scenarios where one resource links to another resource.

The task itself is simple due to the serendipity of looking for information. However, the layman will likely find significant trouble accessing certain information due to the need for understanding certain medical symptoms. Information is structured so that resources link to other resources and browsing can either be short or long cycles. The system is discretionary. The task is not necessary for obtaining medical help, but it significantly helps users provide detailed information that would narrow down medical issues for the professional, reducing the time to scope out symptoms. This task also may serve as a foundation of experience for newer users so that they have precedence when similar illnesses also occur in the future.

The data obtained through the task primarily helps the user become more informed about medical action to take to reduce the severity, impact or improve preventive awareness of diseases so that the user becomes more proactive.

Tasks are generally done online, anywhere with Internet access, typically at home in their office space with their personal computers, laptops, or mobile devices. Users may complement their tasks by looking through

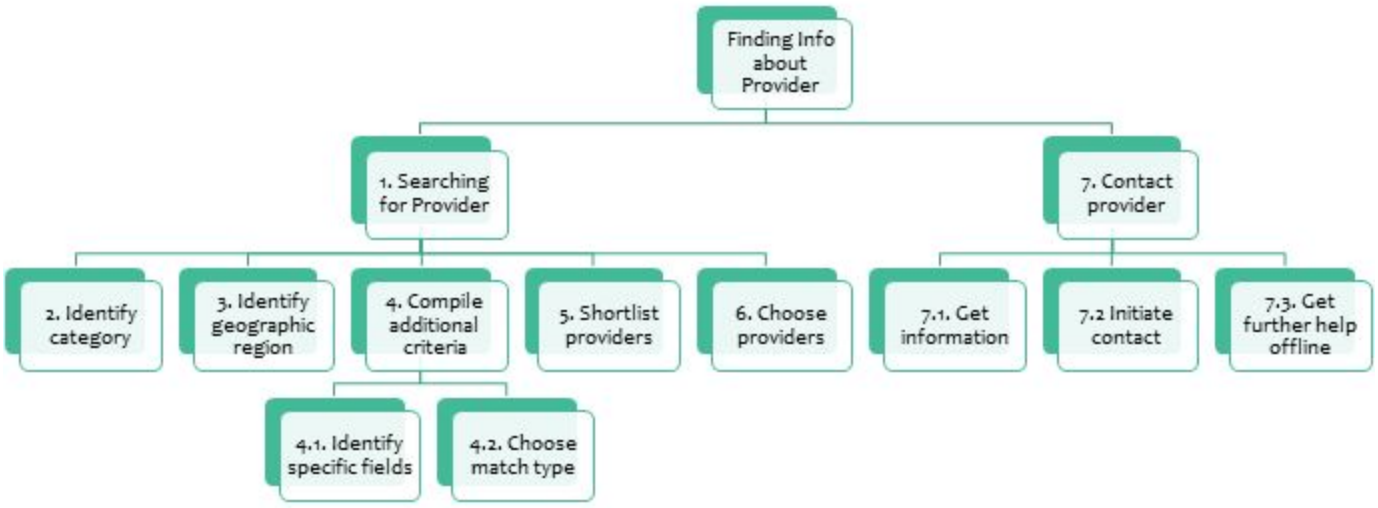
other known sources to ensure that information from one source is generally accepted by all other sources. The culture of the medical professionals may affect the task due to the amount of jargon in medical terminology that would be gibberish for the lay user. As such, tasks may not result in conclusive illnesses, but provide just enough detail for users to make a more informed decision. The culture of medical providers helps increase the number of sources available for users since informed actions help reduce the indirect costs of maintaining medical repositories and practices.

While there is no need for formal training, users may find that navigating the site is difficult despite its uncluttered layout. Tasks are heavily skewed towards browsing, rather than searching, which is a sign that information seekers will likely have difficulty understanding the general purpose of the site. There are no fail saves: when a user finds that they do not know what information is relevant, there are no directions or recommendation systems available to help them based on their previous queries.

TASK 2 : Seeking information about providers

Hierarchical Description

The following diagram is a hierarchical description of this task



Essential Use Cases

The following tables summarises three essential use cases arising out of the above task descriptions. The essential use case distinguish between which steps will be carried out by which entity, i.e. which steps will be carried out by the User and which steps will be carried out by the System.

Search For Provider	
User Intention	**System Responsibility**
Find provider	
	Request criteria
Supply criteria	
	Obtain results
Choose result	

Contact Provider	
User Intention	**System Responsibility**
Choose provider from whom help is needed	
	Supply providers' contact information
Attempt to contact chosen provider	

Scenarios of Use

- **Search for Provider:**
  - Amy is allergic to pollen for years. This spring, she finds that her allergic symptoms become severe. Besides nasal congestion, she sometimes feels hard to breath. She is not sure what exactly happens so she decide to find a local provider. She chooses to find a healthcare provider in her local area, with the specific field of allergy. She submit the criteria and get results of provider information.
  - Betty want to know which medicine is suitable for her 2-year-old son when he coughs from time to time. She searches for medicine provider and tries to contact one of them.
- **Get help from Provider:**
  - Amy goes through the list of provider information, picks one who is the nearest to her. She dials the phone number provided and describes her symptoms. She then sets an appointment with the provider and waits for going to the clinic directly.
  - Betty chooses a medicine provider and asks what she wants to know on the phone. The provider gives her some suggestions about her problem.

General Description of Task Characteristics

Users usually perform this task on a very low frequency, as users can deal a handful of illness by themselves without reaching the provider. The task usually will be the final solution for the corresponding problem. In common, potential users usually tend to do research first, and perform this task only when they cannot solve the problem by themselves. Since this is the last solution, users usually do not care about any external time constraint so they will put a lot of time on this task.

The task itself is not complex, as users always have some extend of knowledge on what kind of providers they are looking for. Professional knowledge is not expected by the task. Searching is structured for convenience, so users can use some fixed words to decrease the scope. System use is recommended but not mandatory. However, it is still of importance that some users may rely on this system to get provider information.

The data that users obtain during the task is to help users contact providers offline and get proper treatment or advice.

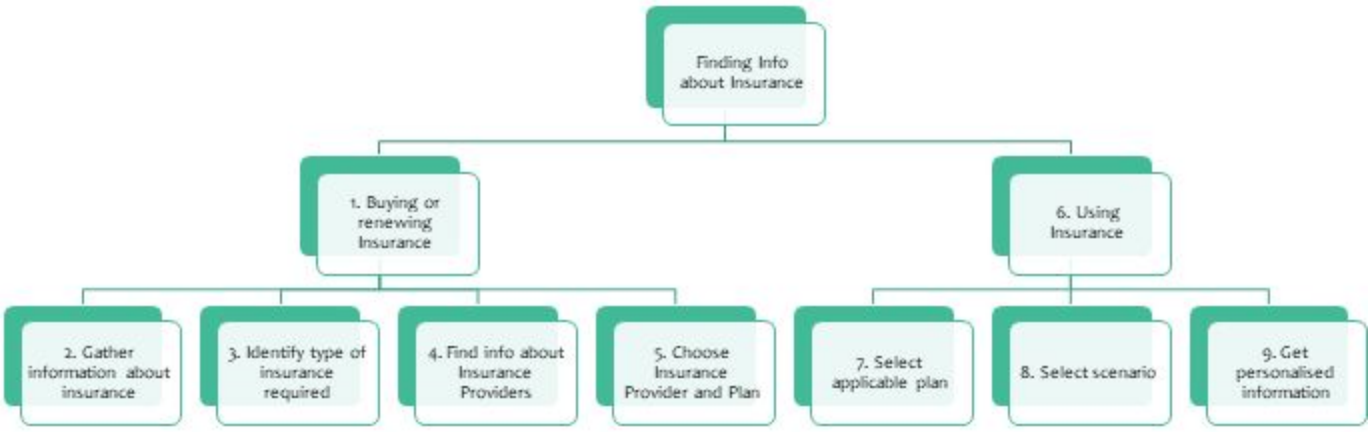
The task is generally performed in users' home, with their personal computers, laptops, or mobile devices. Users may perform the same task on generic search engine like Google. They may also complete the task by consulting friends or their previous providers. The community users are in may have some interfere on users' choices, but it is not significant since there is unlikely with professionals in the community. In general, users cannot tell too much difference among the providers. (Though this may not be true when the user is not a native English speaker, the user may tend to choose a provider speaking the same language).) It is possible that cultural factors may interfere the task, like choosing some traditional medical procedure.

No formal training is provided, using criteria to perform the take may be very similar to how people use other search engine everyday. The task itself and information provided is straightforward and easy to catch up. When the system goes wrong, users do not have any other choice but to contact the site administrator. If the information has mistakes, users can try other providers at first, and submit an error report for the wrong one.

TASK 3 : Seeking information about insurance

Hierarchical Description

The following diagram is a hierarchical description of this task



Essential Use Cases

The following tables summarises three essential use cases arising out of the above task descriptions. The essential use case distinguish between which steps will be carried out by which entity, i.e. which steps will be carried out by the User and which steps will be carried out by the System.

Buying or Renewing Insurance	
User Intention	**System Responsibility**
Get information about insurance	
	Provide educational material about insurance - background, need, advantages, costs, types
Identify the type of insurance	
	Provide detailed information about selected type
Indicate desire to evaluate providers (market study) for buying / renewing insurance	

	Provide means to search for Providers (Task 2)
Search for providers, and shortlist providers who can be contacted for further information about their plans.	
	Provide means to contact Providers for more information (Task 2)
Contact providers, obtain information and choose desired plan and provider	

Using Insurance	
User Intention	**System Responsibility**
Indicate need for help to use insurance	
	Provide options to select plans and providers
Identify the provider and plan in which user is enrolled	
	Provide details about the plan and option to choose scenario for which help on insurance is sought (price a medicine, locate an in-network provider, price a procedure, contact the insurer)
Select scenario of use	
	Provide information specific to selected plan and scenario, including contact details of insurer whom user can contact for further information

Scenarios of Use

- **Buying or Renewing Insurance:**
    - Howard is buying insurance for the first time. He never had any medical insurance before, so he would like to know the benefits of insurance in general before he buys. He is also unclear and confused about the different terminologies (co-pays, deductibles etc.) which he comes across when searching on Google for insurance.
    - Howard comes to the NC Health Info website and searches for “insurance”. The search function is rudimentary at best, giving a list of insurance topics He is brought to a general information page about how to choose insurance and some transcripts that mention the word insurance.

    - On going through the presented document, Howard identifies some basic terminologies about medical insurance and also decides that he wants to buy a general health insurance plan
    - Howard proceeds to search for insurance providers but doesn't find any listed at the NC Health Info website. However, the main document from his search result mentions several websites (Health Insurance Marketplace and Health Insurance SmartNC) where he can shortlist providers.
    - Proceeding to the external websites, Howard compares plans on the external websites and chooses an insurance providers
- **Using Insurance:**
    - Linda is a customer of BCBS insurance company for the last several years. For many years she has maintained good health but recently she was prescribed a ultrasound test by her doctor. Linda would like to know how much her insurance would pay for the test at different providers. Based on this information she would like to schedule an appointment with a provider that gives her the best service at the least cost.
    - Linda comes to the NC Health Info website but is unable to find any leads.
    - She then proceeds to the website of her insurer, BCBS and logs into her account. Here she can choose her location, and the test prescribed. The site returns a list of providers closest to her location, where she can get the test done. Against each provider, the site also lists the exact amount she will have to pay for the procedure, since at this point, the system knows Linda's specific insurance plan.
    - Linda can also tweak the search criteria to include farther locations, and also include less stat rated facilities (4 star vs 5 star) to see if she can get similar quality at significantly lower cost.
    - From the list provided to her, Linda can see the contact information for the specific provider and book an appointment.

General Description of Task Characteristics

This task is not performed quite often, but nevertheless there is a huge impact of having the right system in place for this. A large amount of effort is made by people in navigating the medical system and a chunk of that deals with health insurance.

Most of the people do not know much about insurance so education is a very important first step. Buying insurance is an activity that one performs only once in a while, such as once in a year or once in six months. People will search for it only at the time of buying insurance for the first time. Thereafter, due to the renewal nature of insurance, there will not be much interest in searching for insurance at renewal time, but only in those cases where the user has had a bad experience with a provider.

This task does not have any time constraints by itself, but this is a earlier-the-better kind of task because of its criticality. Insurance is a very important for people and it is better that they have it at the earliest.

This task is also very complex, because taking insurance is a huge decision. People want to be as sure as they can be that they are making the correct decision. Also, since there are so many providers in the market

today, that makes the decision even more difficult. This is why people will want to research as much as they can before deciding on a provider.

Another aspect of tasks dealing with insurance is - using the insurance. This typically has the scenario when a customer who has bought insurance in the past is looking to make use of his or her insurance policy to pay for medical costs. Normally this is not straightforward. In our use case scenario (based on a true incident), the user has been directed to a particular test but has no clue how much she will have to pay for the procedure. The test provider can at best inform her of the total costs and the insurance provider normally will not make such information easy to obtain. Talking to the insurance provider's customer care does not help. Finally, after multiple tries, the user is directed to a section of the insurance providers website where "indicative" costs of the procedure can be seen. Even though this information is only indicative cost, it still provides a comparative basis for the user to make a decision on where to get the procedure done.

This task will be performed in the user's home or office, using a personal computer. It is given due amount of time, and not done in a haste. People take out time to sit and read about insurance. This can be performed using any device that allows internet access. It doesn't require any specific training. But it will require some decision making on the part of the user to choose the correct hyperlinks to get to the required information. The data gathered from this task is extremely important to people because it takes a lot of comparing various providers and the pros and cons of every option before a person can make a final decision.

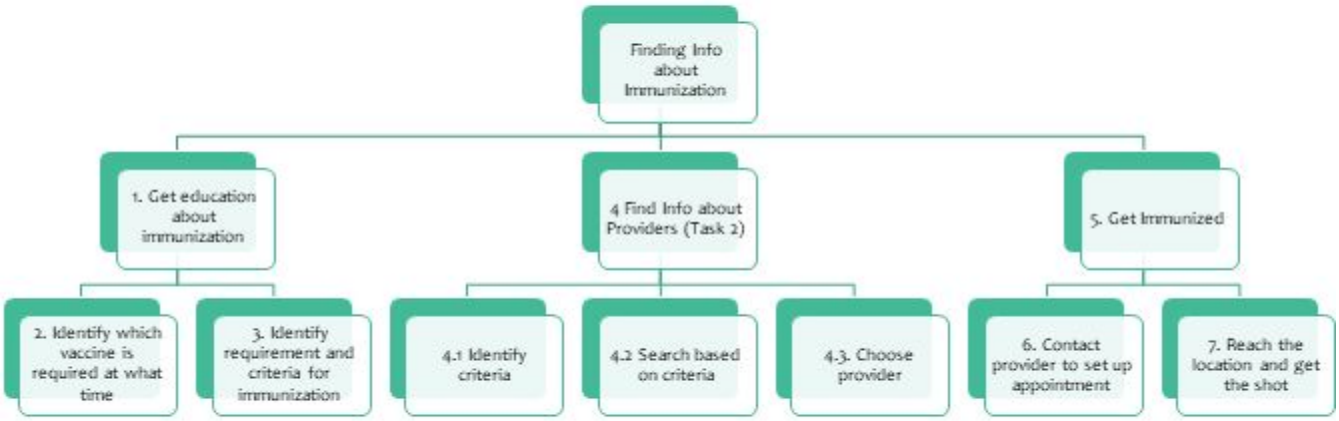
As a user goes through the website to accomplish this task. They are faced with too many choices at every step. There will be multiple links at every page and making that choice at every page can be overwhelming for a user. But once they are able to make all the correct choices they will land at the right place that will be able to meet their information needs. But if a user makes an incorrect choice at every page then there will be too much back and forth between pages and that will result in the user getting frustrated and quitting the task altogether and opting for another resource altogether.

This task, if not completed successfully can be quite disturbing and financially cost intensive for a user, since insurance is a very critical thing, and one cannot manage without it.

TASK 4 : Seeking information about preventive health

Hierarchical Description

The following diagram is a hierarchical description of this task



Essential Use Cases

The following tables summarises three essential use cases arising out of the above task descriptions. The essential use case distinguish between which steps will be carried out by which entity, i.e. which steps will be carried out by the User and which steps will be carried out by the System.

Get Education about Immunization	
User Intention	**System Responsibility**
Find information about vaccination	
	Provide educational material about immunization - need, costs, side effects, timings
Supply further search criteria to focus on a shortlist of immunization needs	
	Obtain shortlisted results
Educate self on vaccination and finalise which immunization is required	

Find Provider	
User Intention	**System Responsibility**
Search for immunization provider in locality	
	Supply shortlisting criteria options
Select shortlisting options	
	Provide a shortlist based on selected options
Select immunization provider, based on further analysis from “using insurance” to determine how much it would cost	

Get Vaccinated	
User Intention	**System Responsibility**
Contact chosen provider	
	Supply local providers’ information
Set up and appointment	
	Provide appointment details to user and provider
Arrive at the location on appointment date and time	
	Provide information about upcoming appointment to ensure that vaccine is available in store
Get vaccinated	

Scenarios of Use

- **Find information about vaccination**
    - Andie is a Chapel Hill resident. She has been hearing that the flu season is here. Today a friend also came down with the flu. She doesn’t want to catch the flu, so she decides to get the flu shots. She doesn’t know where exactly can she get the shots, so she looks it up on NC Health Info website. She searches for “Flu shots” in the search box. This leads her to the

Immunizations page. This page gives the links to various websites related to immunizations and vaccinations.
    - Jake wants to get vaccinations to fulfil the medical requirements of admission to UNC Chapel Hill, where he has got an admit for a Masters program. He has more than one immunizations to fulfil. He goes to the NC Health Info website to check for the immunization shots that the form states he is required to take.
- **Find Provider:**
    - Andie chooses to get a shot somewhere close to her home so that she doesn't have to send more time than required on this activity. She looks up NC Health Info website to look for a provider close to her home. She sees aa few options and then chooses the one which is closest to her home.
    - Jake will be moving to Chapel Hill to join UNC and decides to take the shots after coming to UNC. he searches for provider that are close to the campus, so that he can take the shots once he has joined the program. He would prefer to just go in between two classes and get the shots done.
- **Get immunized**
    - Andie fixes an appointment for the very next day because she wants to get this done as soon as she possibly can. The next day she arrives at the provider's location and takes the immunization shots.
    - Jake fixes an appointment on the first day of classes. He has a lot of time between his classes, so he will go and get the immunization shots during that time.

General Description of Task Characteristics

This task is very specific in nature. Immunizations and vaccinations is not something that people would generally browse just for general informations. People will most likely search about it only when it is required which is not very often. This also makes this a fairly infrequent task. Because of its specific nature, this task will generally results in either "Information found" or "Information not found" kind of scenarios. There is a less possibility of "Some information found" scenario.

As a user goes through the website to accomplish this task. They are faced with too many choices at every step. There will be multiple links at every page and making that choice at every page can be overwhelming for a user. But once they are able to make all the correct choices they will land at the right place that will be able to meet their information needs. But if a user makes an incorrect choice at every page then there will be too much back and forth between pages and that will result in the user getting frustrated and quitting the task altogether and opting for another resource altogether.

This task will be performed in the user's home or office, using a personal computer. It doesn't require any specific training. But it will require some decision making on the part of the user to choose the correct hyperlinks to get to the required information.

This may be a time-constrained task, because a user will look for immunization and vaccination information only when they require one, and this will generally be associated with some time window. For example, in the use scenario above, Andie needs to get this vaccination as quickly as possible, otherwise she may fall sick if it takes too much time for her to get the vaccination, or when someone has to get an immunization as part of a medical requirements to submit somewhere, that will also have a deadline. So, in this case the time taken to accomplish this task is important, because the impact is deep.

Part 4 : Design Decisions

DESIGN DECISIONS

This part captures few of the Design Decisions that arose out of the team's analysis of the website

Broadly speaking, we analysed the websites from different angles, such as

- Information Architecture
- Typography
- Colors
- Layout
- Symbology
- Task Analysis

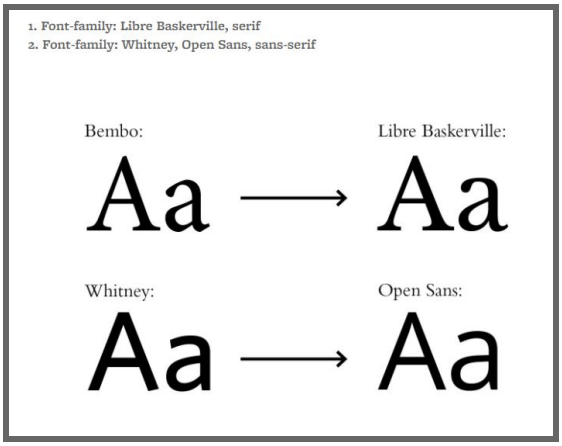
We also conducted some inquiry into usability using the following methods

- CTA Logs Analysis using Google Analytics Data
- Usability test of certain features using Think-Aloud methodology

Based on the above analyses and inquiries, the team was able to arrive at a few design goals (QUESTIONS) that were applicable to the website. For each design goal, we explored different alternatives to answer these questions (OPTIONS). Finally, we selected one of the alternatives as being the alternative of choice. This was based on our understanding of best practices and literature (CRITERIA).

In the following pages, the major Design Decisions recommended by the team are presented in the Q-O-C format.

DECISION SET 1 : On Typography

Question	*Which typefaces (serif or sans-serif) work best for the site in terms of usability?*
Options	The choice of font type has to be a conscious one, consistent with the brand image and target audience. Four basic categories of font families are • **Serif** : e.g. Georgia, Times New Roman. Often associated with tradition, grandeur, authority and reliability. These are normally used for news websites like The New York Times or websites relating to classic themes. • **Sans serif** : e.g. Helvetica, Verdana, Arial. Often associated with clean design, industrial or modern themes. They have a reputation of being contemporary. • **Script** : These are fonts resembling the written word. Usually denote creativity and genius. These are used by companies such as Coca Cola and Instagram. • **Modern**: While there is no separate category as "Modern" fonts, these are typically Sans Serif fonts optimised according to new advances in display technology and higher PPI screens. They evoke modernity and progressiveness and are usually the font of choice above traditional Sans Serif fonts. These are used by companies like Google and Facebook.
Criteria	While Sans Serif fonts are easier on the eye, they can also get boring very quickly. Currently, the website uses Helvetica which was the font of choice in earlier days. Main reason for this was the availability of Helvetica across all platforms and systems. With the advent of web-based fonts, we can experiment with more fonts, giving the website a much more attractive look without having to compromise on readability. **Our recommendation is to adopt a UI optimized typeface, such as a modern font in lieu of the current Helvetica.** The choice of font-face should also reflect the brand identity of the website. Since the NC Health Info website is affiliated with the UNC Chapel Hill brand, **we recommend using the fonts OpenSans** as recommended by the UNC typography guidelines, as seen at (https://identity.unc.edu/typography/) 
Reference	• https://webstandards.hhs.gov/standards/10 • https://www.nngroup.com/articles/serif-vs-sans-serif-fonts-hd-screens/ • https://www.nngroup.com/articles/glanceable-fonts/ • https://www.youtube.com/watch?v=OXc-VZ4Vwbo

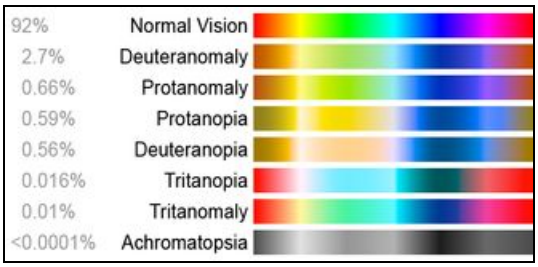
Question	*What is the best font size to be used for better usability?*
Options	A smaller font size (10px to 12px) allows a cleaner view of the page and helps avoid clutter. However, small fonts may make it difficult for older users to read the material. For this website, older users are part of the target user group. Keeping a higher font size (14px or 16px) is useful since it makes it easier for users to read text. However, too large a font interferes with usability and makes it difficult to find the text one is looking for, on the screen. A third option is to allow for the user to control the font size, i.e. user has an option to zoom in on the page. For the current site, we saw that text can be increased by 200% in size without reducing functionality or content.
Criteria	Looking at the desired user base, we need to have a website which is accessible even by older populations and therefore very small fonts may not be useful. On the other hand, larger fonts also take up a lot of space on the page and make it look cluttered. To balance the clutter vs readability aspect of the website, we feel that the current text size of 16 px is a bit too much. **We recommend to reduce the general font size from 16px to 14px as the font size of choice.** This is a sweet spot in the balance and is the same size as adopted by the medlineplus website as well. For increased accessibility, **we recommend that there be a Text Zoom option present on the website** with which the content of the page can be zoomed in by a factor of 200%. This text zoom option can be present as part of a top "utility bar" on the top of the page and should appear on every page.
Reference	• https://www.w3.org/WAI/WCAG20/quickref/?showtechniques=144#visual-audio-contrast-scale • https://www.w3.org/TR/WCAG20-TECHS/G178.html

DECISION SET 2 : On Colors

Question	What color scheme works well for the site?
Options	The color scheme defines the "mood" of the website and reflect the kind of emotion the website wants to convey, or evoke. Bright colors usually go well with websites targeted to children and youth and more sober colors are recommended to be adopted by websites targeting adults in the context of an important topic like health. Further, color schemes are also used for co-branding. E.g. UNC recommends a particular set of colors to be used consistently on all UNC branded material, including websites. Same can be seen at (https://identity.unc.edu/colors/)  The emotions we want to convey through the NC Health Info website is a mix of "healthy", "safe", "trust" and "reliable" **Current Color Scheme is Green oriented**  **UNC Color Scheme is Blue oriented**  Colorblindness: The current color scheme was tested for colorblind users using an online tool. The tool gives the view of the website from the perspective of a colorblind person. On these tests, the website color scheme passed fairly well.

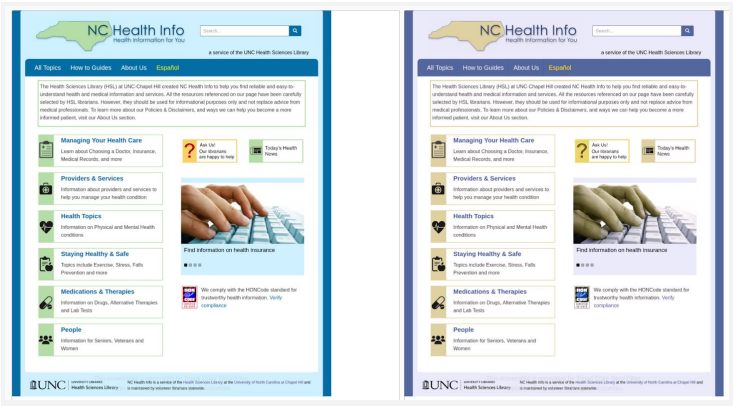
From [Wikipedia](#) - Types of Colorblindness and percentage of humans afflicted by each type.

Deuternanomaly and Protanomaly are not only slightly reduced sensitivity. We need to focus on Protanopia, Deuternopia and Tritanopia to ensure our website reaches maximum users.



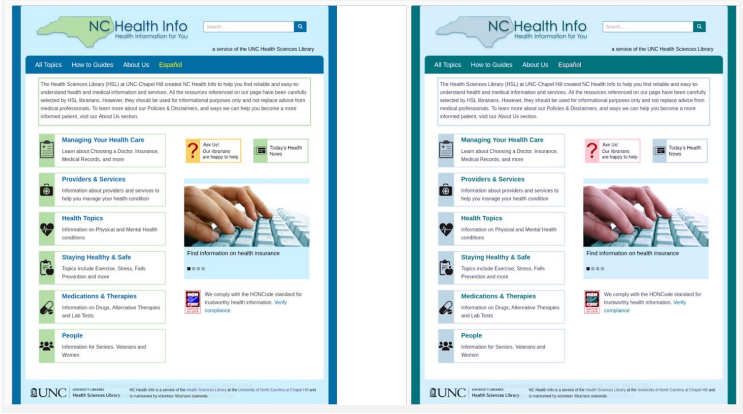
Result of Color Blind Tests

Protanopia



Deuteranopia

Tritanopia



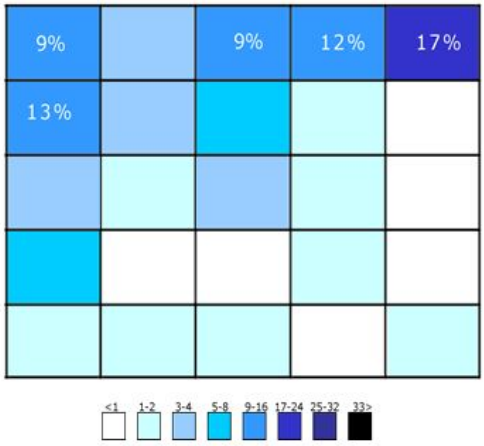
Criteria	Looking at the target population, the color scheme adopted by the website has to be easy on the eyes. For an important topic like health, we recommend using more sober colors. The website colors have to be compliant with the colorblind analysis as well as WCAG standards (Web Content Accessibility Guidelines)https://www.w3.org/WAI/WCAG20/glance/ The color blue represents trust, security, calmness and stability. Given that Blue is the no. 1 preferred color by both men and women and that Green is the no. 2 preferred color, we recommend switching the color scheme from Green-prominent to Blue-prominent. Switching to the Blue-prominent color scheme will also enable the website to co-brand itself with UNC. **We recommend adopting the UNC Brand Colors on the website.**
Reference	• https://www.w3.org/WAI/WCAG20/glance/ • http://colorsafe.co/ • https://www.websitebuilderexpert.com/how-to-choose-color-for-your-website/ • https://www.shopify.com/partners/blog/best-website-color-schemes

Emotions conveyed by Colors From : **https://www.websitebuilderexpert.com/wp-content/uploads/2016/03/Personality-of-color-infographic-by-website-builder-expert.jpg**	

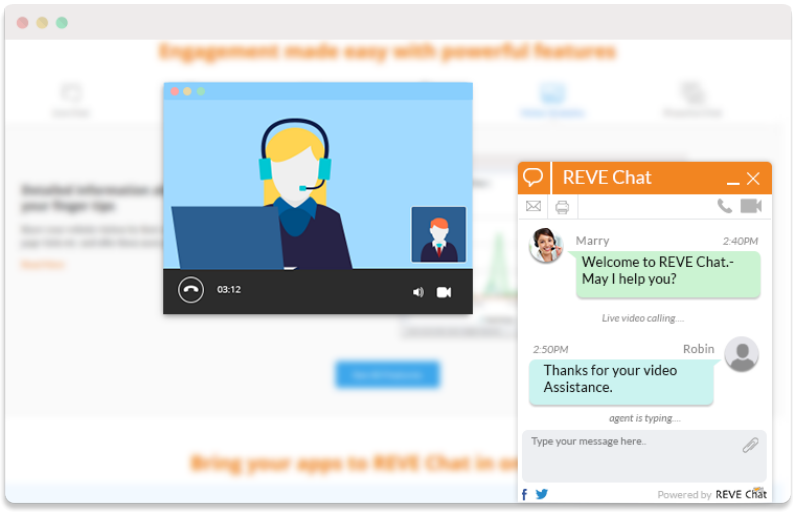
DECISION SET 3 : On Navigation Elements

Question	Reducing the frustrations of users when navigating the site Q1. Navigating back home
Options	Navigation elements like "Home" buttons should be consistently placed on the website. These elements should be present on all pages. This helps users predict the features and locations of content and reduces cognitive load to search for this regularly used information again and again. **Navigation for "Home"** ● The Home button can be present as an explicitly marked link or button as part of the persistent navigation menu. ● It can also be present in a hidden way. i.e. the top-left part of the website may contain a logo which when clicked will take the user to the home page.
Criteria	**Navigation for "Home"** Currently, the website adopts the scheme where clicking on the top left logo, which is a map of NC takes the user to the home page. ● Why is this good? ○ A lot of websites including MedlinePlus uses the same strategy - use logo to be the home button. It has become the new standard these days.  ● Why is this not so good? ○ It might not be a common sense for some people, especially elders, that clicking logo can get you to the home page. ○ Some people do not arrive directly to a home page. Instead, they arrive by using links from search engines or other sites. There needs to be an obvious link to the home page in order for the user to be able to access other features of your Website. There is a menu bar but the menu bar does not include any link back to the Home Page. ● It is recommended that the website allows users to quickly jump back to the home page if they navigate to some page. ● Not having an explicitly marked Home link will confuse those users who are not internet savvy and they will be left searching ad confused about how to go back to the main page. **We recommend including a Home Icon on the main menu bar** to the left of the existing menu text items. This will not take up too much additional space on the menu list but will still make it simple for the users to navigate back to the home page. **The existing functionality of clicking on the NC state-map logo should be retained.**
Reference	● https://webstandards.hhs.gov/standards/29 ● https://www.nngroup.com/articles/homepage-links/

Question	Reducing the frustrations of users when navigating the site Q2. Switching the language
Options	NC Health Info is a website with a multilingual user base, i.e. it caters to English speaking as well as Spanish speaking populations. Naturally, there should be a functionality for the user to switch the language of the interface from English to Spanish and vice-versa. The text of the "switcher" should be in the opposite language. For example, on the english page, the text should be "En Español (In Spanish)". This will cater to both populations and give them appropriate directions. To the spanish language speaker landing on the english language page, the text of the button will indicate that this is the button to be pressed to view the page in Spanish. To the english language speaker on this page the text in brackets will also convey the same information. Correspondingly, on the Spanish page, the text should be "In English (En Inglés)".
Criteria	The option to switch the language is currently present as part of the menu bar on the website. ● Why this is good? ○ The menu bar is consistently present on all pages so this "switcher" is easily available. ● Why this is bad? ○ The link is lost in the wording of the menu items, and to the casual eye, it looks just like another item, although the color has been changed. ○ For a non-english speaker to come to this website, this should be prominently placed as the very first few things that they will notice. **We recommend moving the language switcher item to a top utility bar on the page along with the page size options.** The item should also have **text and an icon symbolizing language or country**, such as a flag, to make it readily distinguishable from the other items in vicinity.
Reference	● https://webstandards.hhs.gov/standards/13 ● https://www.nngroup.com/articles/international-web-usability/

Question	Reducing the frustrations of users when navigating the site Q3. Searching
Options	Searching is a very important task, especially for the users of this website who come to the website looking for information. Search button should be consistently placed, such that it is accessible from all pages. **Put the search box where users expect to find it** There's an ongoing debate about the best place for the search box on a website. But many popular websites such as YouTube, Amazon, IMDB, BEST BUY place the search boxes towards the top center or top right of the page. A. Dawn Shaikh and Keisi Lenz created a chart showing the expected position of the site search form, according to a survey they conducted with 142 participants. The study found that the most convenient spot for users would be the *top right* or *top left* of every page on your site, where users could easily find it using the common F-shaped scanning pattern. Placing it somewhere unexpected means users need to put in extra effort to find the search box.  Users first look to the upper-right corner for search. If they don't find it there, they start scanning the top of the page. The search results should be relevant and should provide the user with a simple list of articles to click and proceed in their discovery.
Criteria	Checking the search functionality on the NC Health Info website against the placement and listing criterion shows that the search button and listing functionality is in good adherence with the recommendations. On the functionality, **we recommend that the search bar should incorporate an autocomplete feature**. As part of the other recommendations, we will recommend that the search bar should move to the top along with the proposed utility bar with the text and language buttons.
Reference	http://www.uxbooth.com/articles/best-practices-for-search/

DECISION SET 4 : On Highlighting Key Website Features

Question	Where do we place the “Ask a librarian” option so as to keep it visible yet not interfering?
Options	The "Ask a Librarian" option is an important goal for the NC Health Information administrators. They want more and more users to use this feature and ask questions from a Health Librarian. Currently, this feature is not being used too much and it would be ideal to place it in such a way that users can access it from any page. There are three options to make the feature available on every page • Have a dedicated page for "Ask a Librarian" and provide a link to it from the menu bar • As a small window on the bottom corner of the page which can be minimised if not required • As a sidebar on the left or right side of the page which can be expanded or collapsed as needed
Criteria	Ideally, a collapsible window at the bottom of the page is quite popularly used in many websites meant for customer interaction. A lot of websites use this functionality to connect the support staff with the visitors of the website.  We recommend going with this version as a default for the NC Health Info website. Additionally, we think that there should be a dedicated page linked through the persistent menu on the top that takes the user to the "Ask" feature. This page should list the recent queries that people have asked and the recent answers they have received. This will allow frequent queries to not be repeated by the users.

Part 5 : Design Description

System Map and Prototyping

In the previous exercises we had conducted a series of analysis such as User Analysis, Task Analysis, Heuristic evaluation to arrive at a set of Design Decisions that we wanted to implement on the website.

This document picks up from that stage and proposes the following.

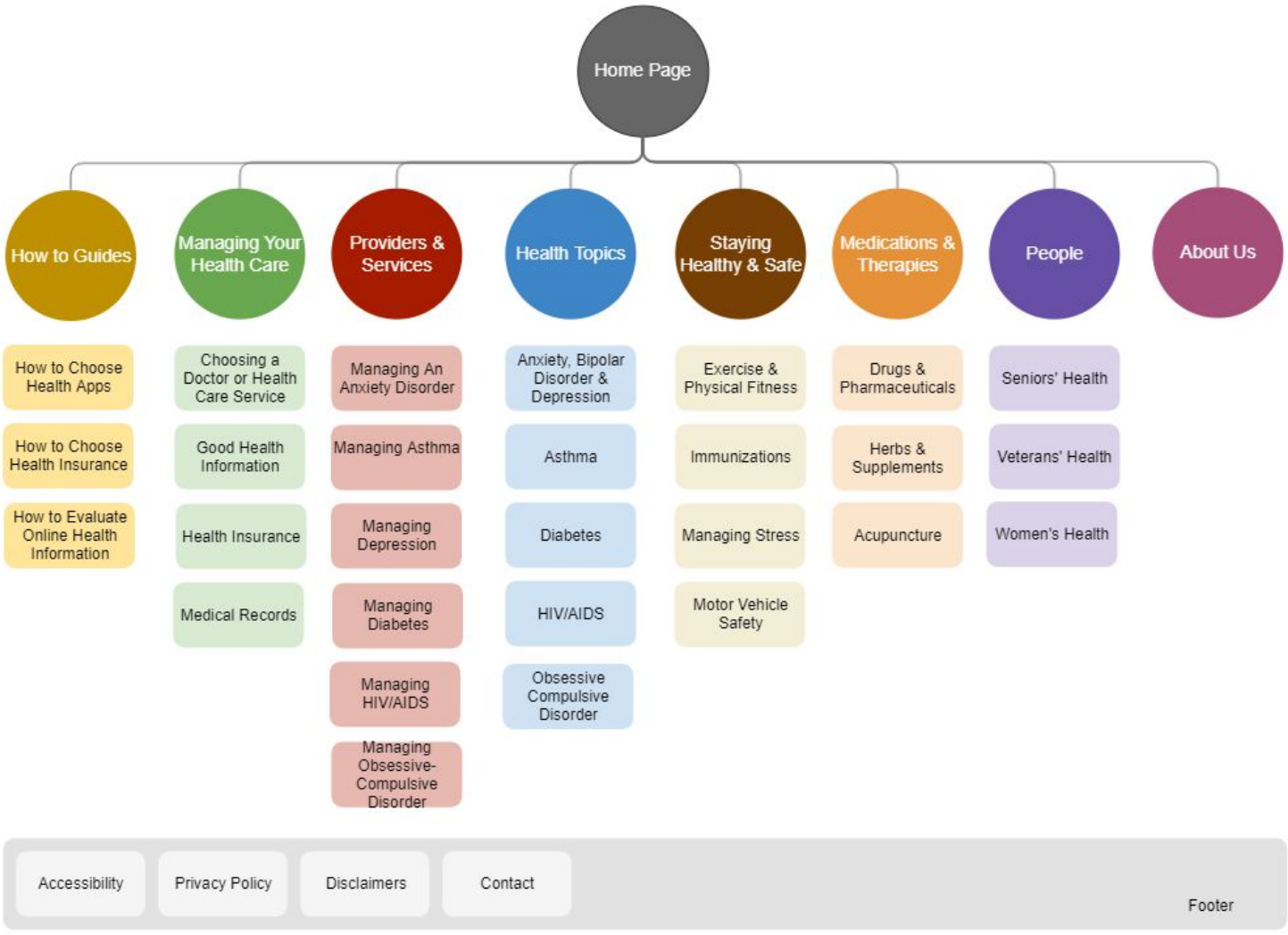
- System Map
- System Transition Diagram
- Prototype

SYSTEM MAP

We created a system map based on the existing Information Architecture and then created an updated version of the same, based on inputs from

- *Task Analysis*
- *Design Decisions*
- *Card Sorting Exercise*

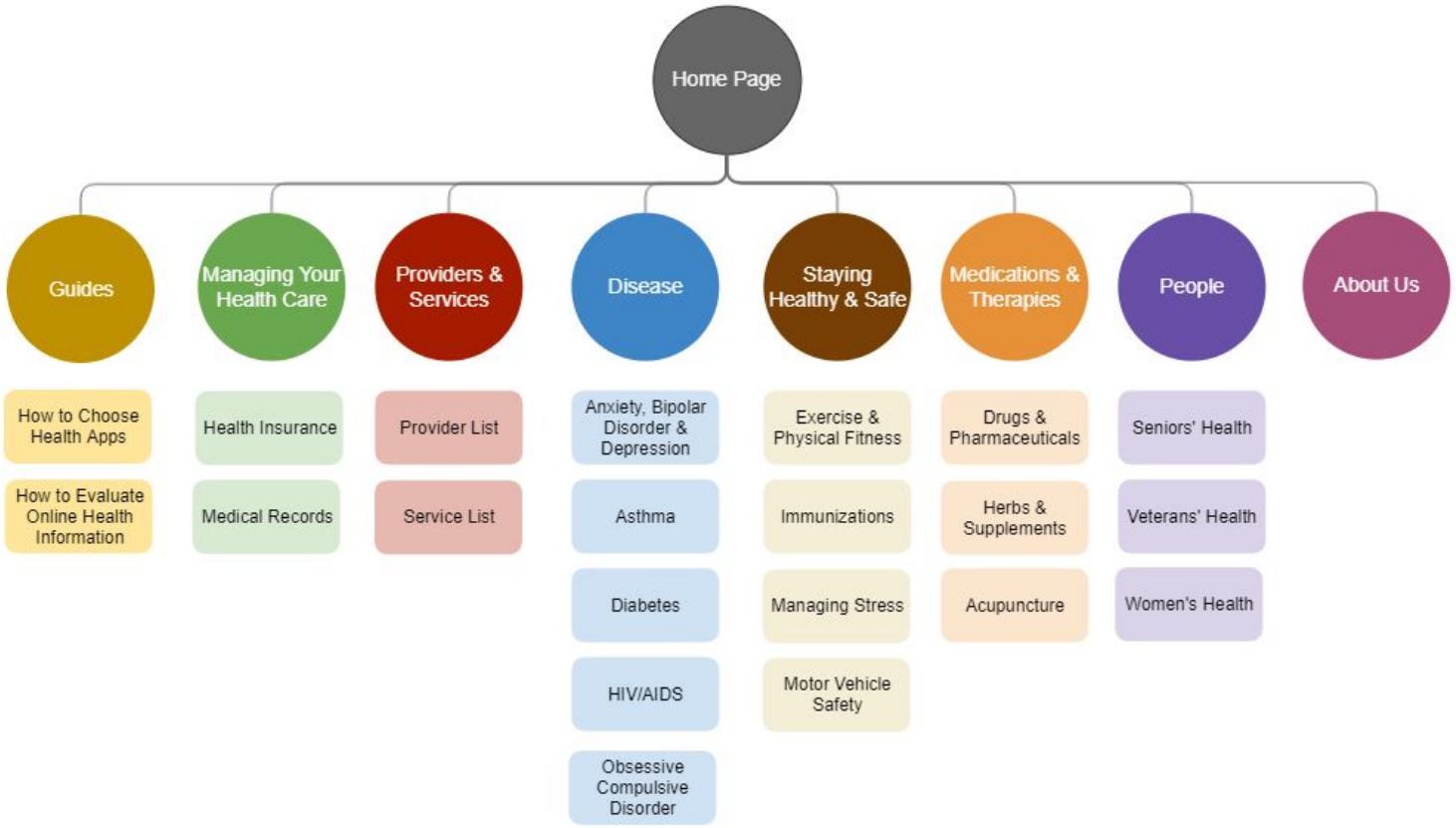
CURRENT SYSTEM MAP

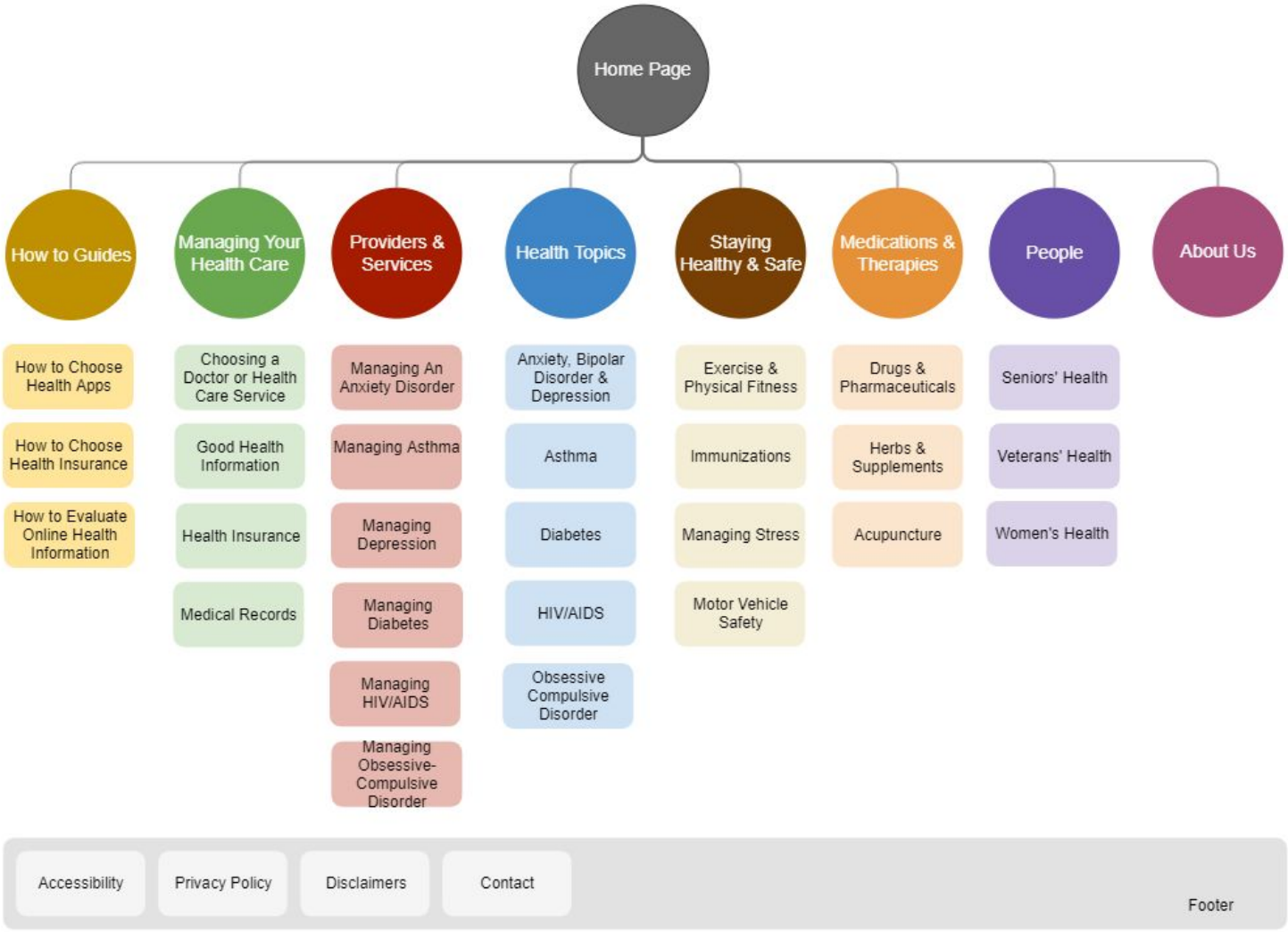


Following are a few observation from the current system map

- *The same health topic appears under multiple categories*
- *Some categories look similar and it is difficult to tell what is the difference*

PROPOSED SYSTEM MAP



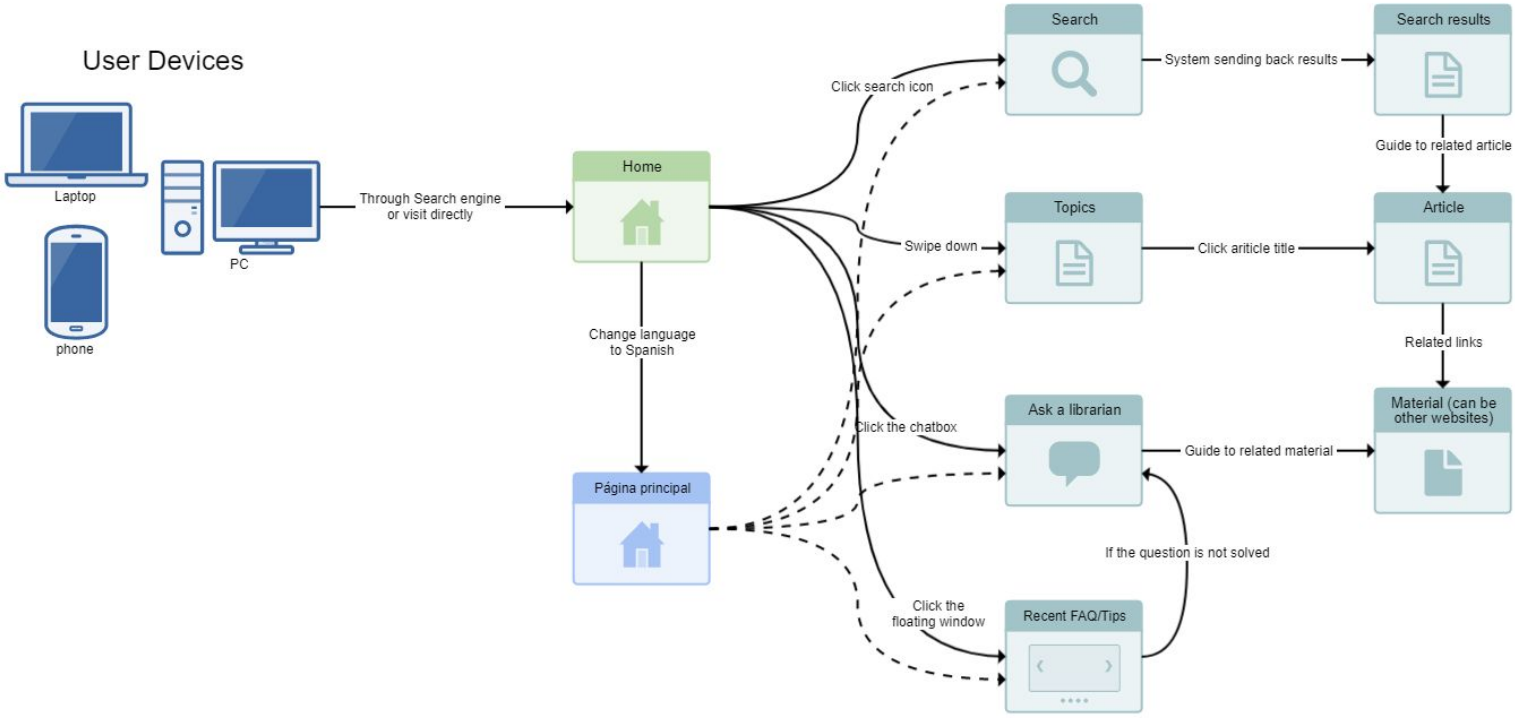


Following are a few changes made in the proposed system map

- *There is less overlap in topics*
- *The categories are more clear and less confusing*

STATE TRANSITION DIAGRAM

This diagram shows how the user will move from one page to the other via clicks. This provides an overall user journey across the website.

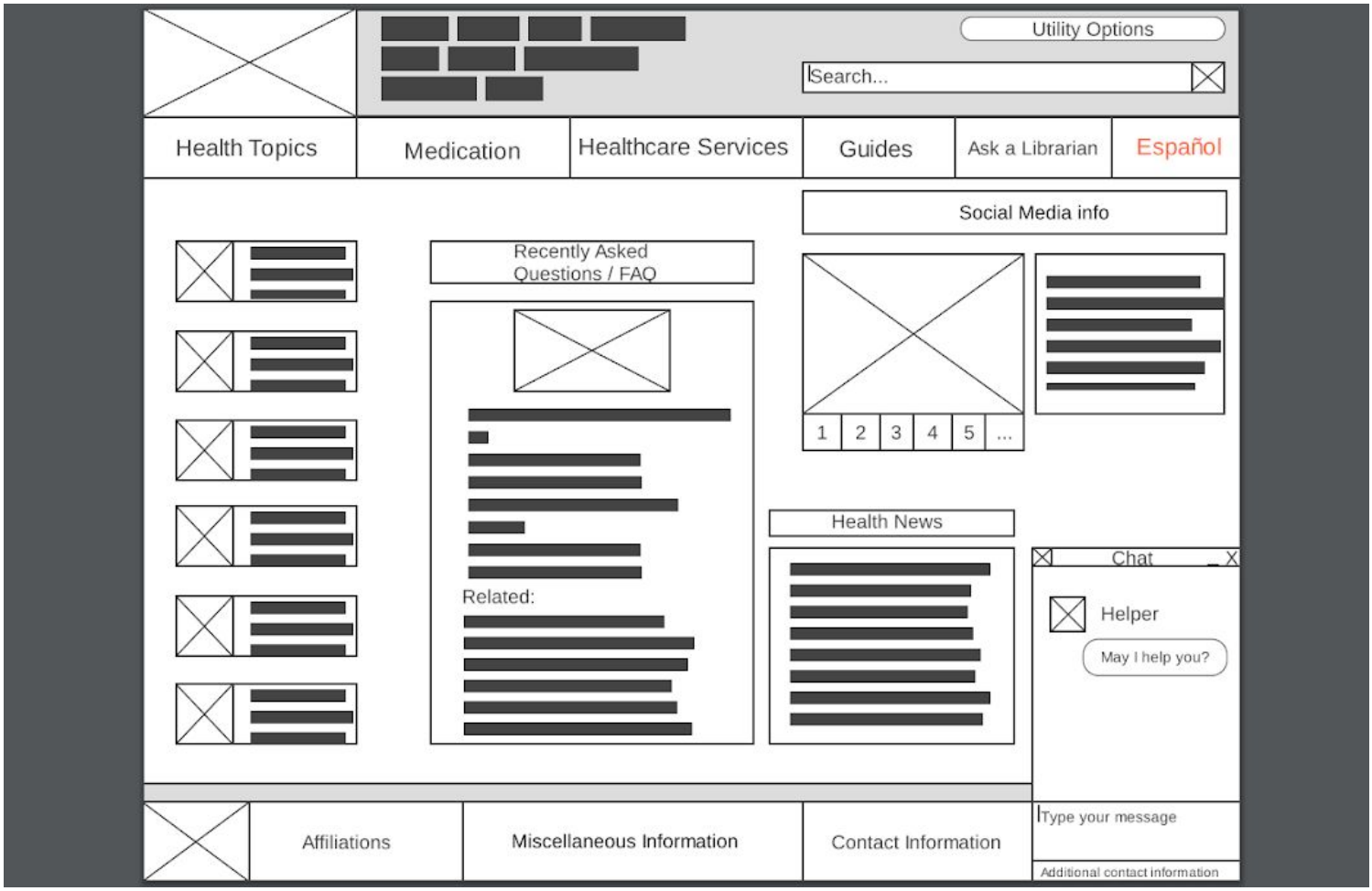


PROTOTYPING

We have created a low fidelity prototype of the landing homepage, as that was the main focus of the user interface assessment demanded by the client. This will help us in initial user testing.

This low fidelity prototype will help us conduct usability test and evaluate the effectiveness of the key proposed changes. These changes can then be discussed with the client and further prototypes can be created.

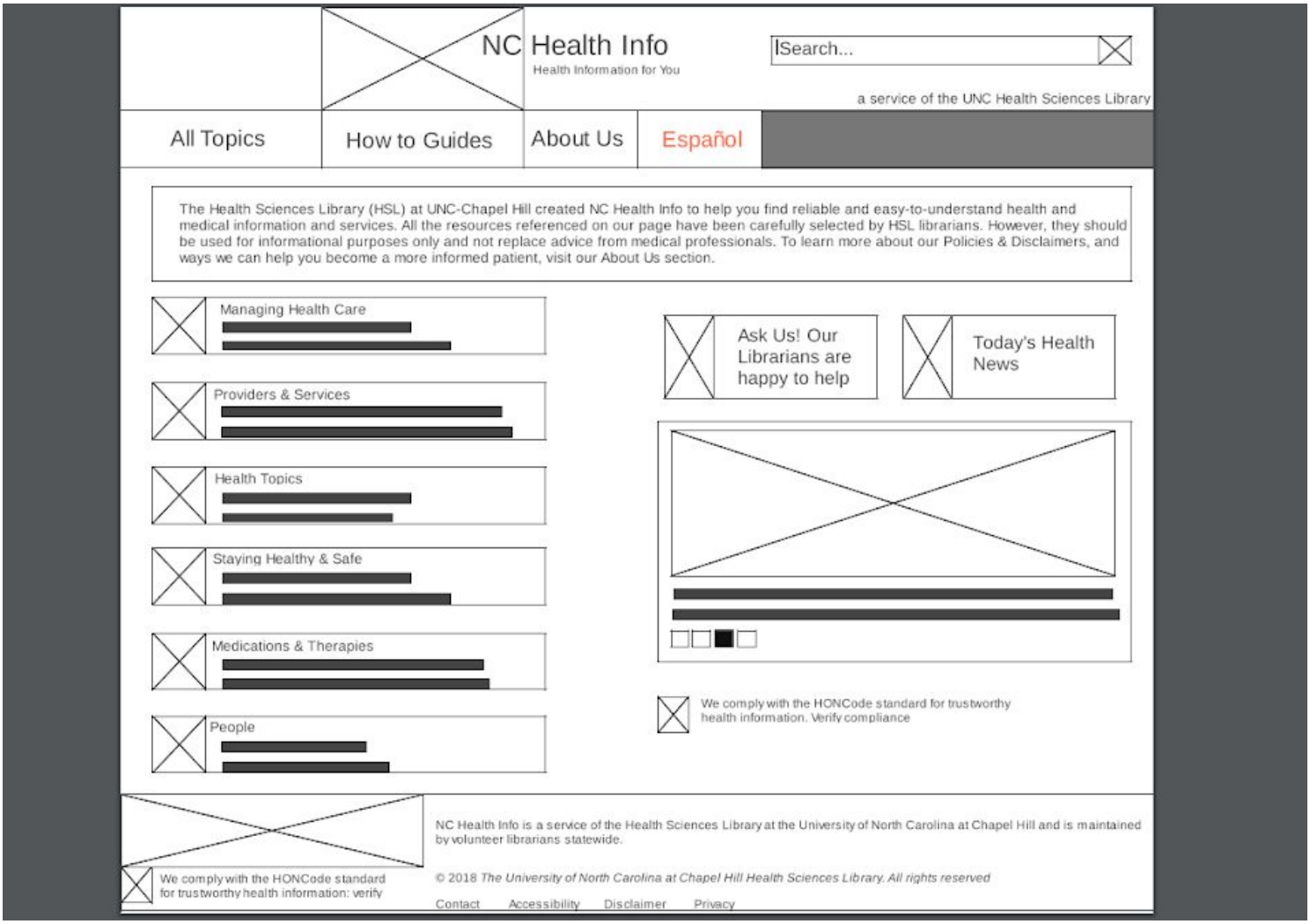
PROPOSED WIREFRAME



The proposed website would have the following changes as shown in the wireframe prototype above:

- *A 'Utility Options" drop down*
- *Lesser and clearer categories in the top navigation bar*
- *Auto-suggest feature in the Search option*
- *A "Recently Asked Questions" or "FAQ" section*
- *A chat window to ask questions to a librarian*

CURRENT WEBSITE'S WIREFRAME (for comparison)



Part 6 : Usability Assessment

Conducting the Usability Test

With the prototype ready, the group conducted a usability study to compare the effectiveness of current website vs. the new prototype.

Since our prototype was a low-fidelity one, we decided to create a similar wireframe reflecting the current website as well. The following was the flow of the test

- Walk the user through the actual website, asking them to conduct certain tasks
- Using think-aloud and directed questioning, we elicited the thoughts of the users while they were performing the tasks. Additionally we noted their nonverbal response (twitching, feeling confused, thinking etc.) at various points of the test, to evaluate the cognitive load of the respective task on th user
- After they had performed all tasks on the actual website, we showed them the wireframe of the current website, so that they could mentally "map" the current website to the wireframe.
- We briefly asked them to imagine working with the paper prototype of the current website with the tasks they had just performed.
- We then showed them the new wireframe of the proposed website design. We then used the same think-aloud methodology to capture their response on the prototype design.
- Detailed script for the test is given below.

Usability Test Script

1. Greetings

2. Privacy statement - "*Your feedback will be completely anonymous and no personal information will be collected as part of this test. At any point of time you can choose to not continue with the test. If that happens, you have a choice to let us retain your test results or to discard them. After the test completes, you still have a choice to let us retain your test results or to discard them.*"

3. Introduce our project - "*Our project is to redesign of the NC Health Info website.*"

4. Ask the user to go through Tasks 1-5 on the CURRENT WEBSITE

    a. Before the start of each task, tell them what the task is
    b. Tell them that they should **think aloud** about how they are processing the task, step by step, and also what they are finding on the website, is it helpful for them to perform the task or not, and in what ways it is helpful, and in what ways it can improve. E.g. If I have to change the text size, then I will look for a button that allows me to do this, or I will go to the browser zoom settings, etc.
    c. Ask the user to begin the task
    d. Start the timer and make notes about user thoughts, expressions and clicks.
    e. Wait for the user to finish the task

f. As soon as the task is finished, stop the timer and note down time taken and number of clicks.
g. Ask the user to share overall feedback on this task.
h. Repeat the above process for tasks 1-5 on the CURRENT WEBSITE.

5. Ask for overall feedback on CURRENT WEBSITE, maybe the user has additional feedback?

6. Show the user the paper prototype of the CURRENT WEBSITE and ask them to get comfortable with the paper prototype. Elicit analogous comparisons between the actual website and the paper prototype. Goal is for user to get familiarized with the paper prototype so that they can evaluate the new prototype.

7. Ask the user to go through same tasks, following procedure 3a to 3f, on the prototype of the NEW DESIGN

    a. This time, at the end of each task, also ask for thoughts on whether it was easier, or difficult on the NEW DESIGN
    b. If still difficult, then also ask how the NEW DESIGN could improve.

8. Ask for overall feedback on NEW DESIGN, maybe the user has additional feedback?

9. At the end of all tasks on both websites, confirm all your notes with the user, and ask for overall comparative feedback

10. Thank the user and re-confirm if they are still okay for us to use the results from this test. (in rare cases, users may change their mind during the test, and they may withdraw consent to share their test results)

To compare the main design changes, we asked the users to perform the following tasks.

Task List
1. Change the text size of the website
2. Find the info for Asthma (browse the website)
3. Find the info for Asthma (search the website)
4. Find a local provider (doctor) contact info for help with Asthma
5. Go to a sub page and navigate back to home page
6. Try to contact the librarian and ask about Asthma

Feedback from the Usability Test

Information Architecture

- **Design consideration / change proposed:** The new design incorporates a different categorization and organization of pages on the website as compared to the existing website.
- **Evaluator's opinion:** Both the evaluators identified this change as a **strength of the proposed design**.
- **Evaluator's detailed feedback:** The evaluators noted that current website has a lot of redundancy in the naming of the topic categories which makes it difficult for the users to guess what is contained under which category. For example, there are two categories, "Asthma" under "Health Topics" and "Managing Asthma" under "Providers and Services" both of which sound very similar so the user gets confused where to look for this information. In the proposed information architecture, this information is proposed to be clubbed under one category "Disease".

Utility options for changing text size, language etc.

- **Design consideration / change proposed:** The new design incorporates a space on the top right side with options for site-wide changes ("Utility Options") such as increasing / decreasing the font size, zooming in, changing the language etc.
- **Evaluator's opinion:** Both evaluators consider the introduction of the utility bar as a positive change. One evaluator found this feature to be an improvement over the existing option, while the other was comfortable using the existing language switching option but did not mind the option being moved to the utility bar.
- **Evaluator's detailed feedback:** The evaluator felt this was a good way of grouping options that relate to giving the user the control to change how the website looks to suit their needs. While the term "Utility Options" is fairly intuitive, it would be better to have icons in a bar rather than a drop down as that would make it easier to locate an action than to open the drop down and select.

Ask a Librarian chat feature

- **Design consideration / change proposed:** An "Ask a librarian" chat window and an FAQs section that displays the recent most popular questions asked
- **Evaluator's opinion:** Both the evaluators welcomed this change. In the test, one evaluator was not able to notice the "Ask a librarian" feature on the existing website and was quite impressed with the popup chat window option of the proposed change.
- **Rationale offered:** The evaluator felt this was a good idea since one may want to contact someone for a question that is not being answered by the website or if the user is having trouble locating information. The FAQs section would help to save time if the user also has a question that a lot of people are asking. One thought that the evaluator has was that if the chat window is by default collapsed, a user may not notice there is a chat window. The suggestion was that the chat window should be open by default and should be collapsible by the user. Another feedback was that it might

seem that the chat feature exists to chat with the maintainer of the website, so it is important to emphasize the fact that this chat feature is for chatting with librarians and not for the website maintainers.

Redesigned layout of the home page - four column design

- **Design consideration / change proposed:** The redesigned homepage incorporates streamlining of elements and removing implicit hierarchies (based on gestalt principles), so we ended up with a four column design.
- **Evaluator's opinion:** One evaluator noted that the four-column design was making the homepage too much cluttered. The other evaluator did not have comments on this aspect.
- **Rationale offered:** The evaluator felt that there were too many sections. It was suggested that some sections could be grouped together to reduce the number of sections.

Redesigned layout of the home page - navigation menu items

- **Design consideration / change proposed:** The redesigned homepage incorporates streamlining of navigation menu and renaming of the navigation menu items in line with the proposed information architecture.
- **Evaluator's opinion:** Both evaluator noted that the navigation menu item listed as "Healthcare Services" is not intuitive.
- **Rationale offered:** The evaluator felt that the term "Healthcare Provider" is more intuitive than "Healthcare Services". Healthcare Services may get a user to first think what this is about, maybe this is a service being offered by the website? The word "Provider" would be a better option since that makes it clear that the user can click here to look for a service of any kind (insurance, doctor, labs, etc).