Team Scrubs - Part 3

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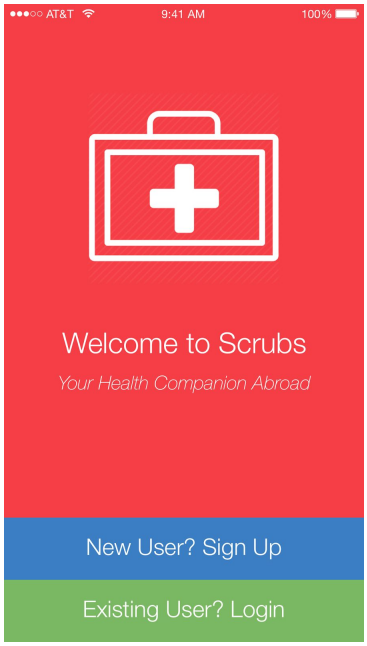
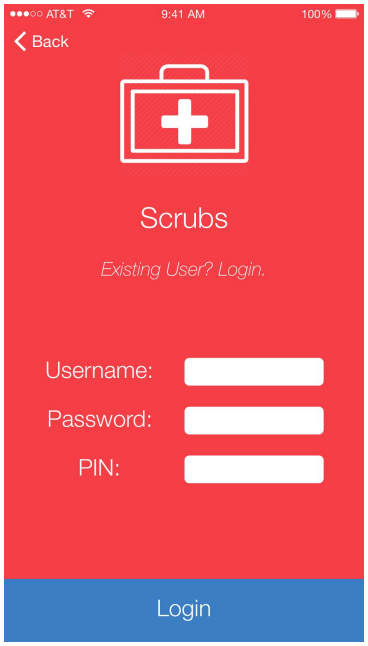
I. Description

Description of System Prototype

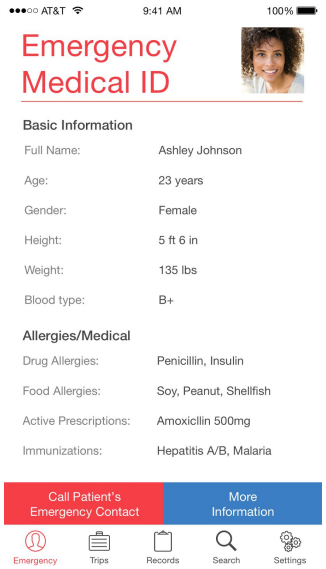
Welcome to Scrubs! Below you will find a brief navigation of our prototype along with a few descriptions to explain how a typical user would interact with our mobile applications. Below is the first screen a new user will see once they have downloaded the application and it directs the user to two pages (login or create a new account) by the buttons at the bottom of the screen.

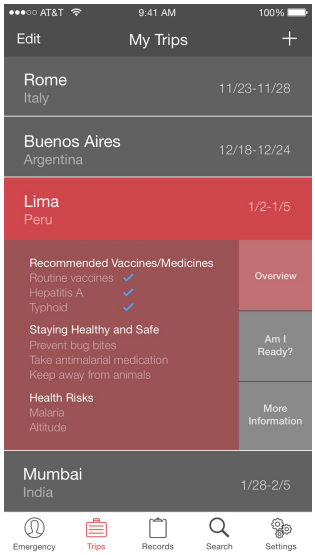




The login page is important for one particular reason - the PIN. Our application focuses around very sensitive medical information, because of this we wanted to add an extra element of security. Using a PIN along with a password provides this extra element. A combination of this type is common practice for an extra layer of security; for an example, USAA is a diversified financial service group and they use the same practice when you're accessing your account.

After the user has logged in, the first screen they will see is their Emergency Medical ID. From this location, the user can navigate to anywhere in the application by a single click. For an example, if the user wanted to navigate to the trips page, all one would have to do is click on the trips icon at the bottom of the screen. Any page in the app can be accessed this way, making navigation easy and user friendly. This is essentially how a

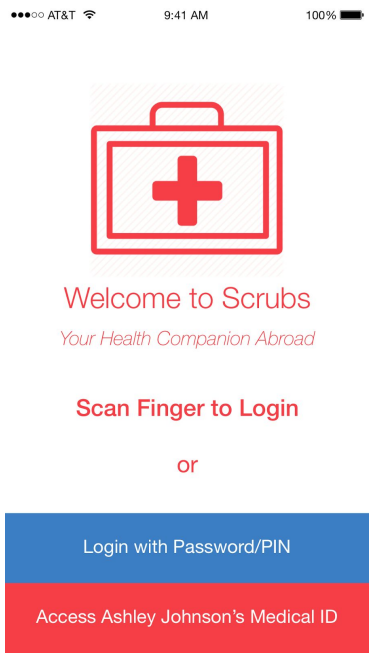




user would be interacting with our app once they have logged in. Above is an example of what would happen if the user did click on the trips page from the medical page.

Implementation Challenges

We encountered several implementation challenges once we began to turn our design into a user-centered, testable prototype. Of these challenges, the most difficult to understand and to take into account in the prototype was the mindset of a user in an extreme medical situation. In these situations, the user can be the owner of the mobile device or bystander who saw an accident where the owner is unable to physically provide their critical medical information. We solved this challenge by creating a button on the first screen of our prototype directing anyone to the critical medical information of the phone's owner (see image below). To remain kosher with pertinent medical laws; this feature has to be enable by the owner. If this button is clicked while the owner has not enabled the feature, and message will appear notifying the current user this feature has not been enabled.



A main feature we wanted to include in the prototype was to give the user the ability to upload medical records from the phone. Ideally, this allowed the mobile application to be all-inclusive, but in practicality, this was a bad idea. Uploading numerous medical records on a mobile device with a limited screen can be tiresome and exhausting, and it was not visually appealing. Because we could not include this function, we developed a two-pronged workaround. The first way is for the user to travel to our URL and manually enter the information from a computer. The second way, the user's doctor will upload the information directly. Obviously, this involves the patient's consent. It is also important to note and understand, the URL is not connected to this prototype but we did create it.

Justification

The wheel is probably the world's oldest known conceptual model. Everyone knows how it works - it rolls. We are not stating this to make light of conceptual models, but rather to show the scale at which the wheel is understood. Because of this, could you fathom reinventing the wheel? No, and we wouldn't either. We used a similar rationale combined with our peers' feedback when we decided our horizontal design layout would be the foundation of our prototype.

Regardless of language, culture, or geographical location, smartphone users are familiar with a similar layout where an application's menu is always present and we wanted to use this collective understanding to our benefit. This is mission critical in emergency

situations, because individuals struggle with basic cognitive functions and we wanted to maximize recognition versus recall, which was a major factor in deciding to use this design versus the other two designs.

Most importantly, we do not want you to be confused with the horizontal layout being the user-interface design, the former is a component of the latter like how a gear shifter is an important component of a car. All in all, this component combined with the gestalt principles, proper text selection, color coding, and more, makes up the user-interface in its entirety.

What is unique about this design is it was a winner from the start. During our poster feedback session, this design was singled out because critiquers recognized how to navigate between tabs. However, this design is special because of the user-centered format allowing the most up to date health and safety information to be easily digested. Every aspect is designed with the user in mind and not how we as developers would design it, with this mindset we have eliminated many complexities such as developing a hierarchy of steps to navigate the application but rather an open-faced design where the user can go travel to any page in a single click. Our mindfulness of the user's predicted mentality helped us bridge the gap between medical information and travelling. The prototype we created is a first attempt solution to the complex problem.

II. Requirements

We thought of some crucial requirements for the Scrubs application, based on the overall goal of the product, and also key objectives for the user. Because the application will be used while traveling and also to manage complex and always changing information, we thought that simplicity should be the number one priority. This will allow the user to access and edit information quickly, and also to navigate the app in many situations. Below we have broken down the requirements into functional parts of the design, where we tried to keep simplicity at the forefront of our interface.

Limited Number of Screens

One of the easiest ways to make a mobile application complex is to include a large amount of screens in the interface. In the *Scrubs* app we wanted to eliminate this issue by only including what is absolutely necessary for the functionality of the application. Therefore, we kept the number of screens to only four so that every screen can be reached from the bottom navigation bar. This will adhere to the simplicity behind our design, and allow the user to reach any part of the application within three clicks.

Support Countries Across Globe

We also thought that the application would be useless if it didn't support a majority of the destinations that our customers will be traveling to. Therefore, we may it a priority to make sure that a credible source was able to provide health standards for many nations, and also suggestions for traveling there. We were able to find many sources that fit this description such as the *CDC Traveler's Guide*. A specific metric of our application is to cover 75% of the countries in each continent across the globe. This excludes Antarctica and Australia, where we will cover 75% of the inhabitable regions on those continents.

Security

Another requirement of our application is the confidence in security. Users will be storing very sensitive and private information such as their medical history, SSN, and insurance information. It is a vital requirement for our application to store this data securely and easily editable in case the user ever wants to remove or change their current information. We have decided to not only use an username and password login, but also a PIN number for extra protection. The PIN will be required anytime the user has stopped activity on their phone for more than a minute in order to re enter the *Scrubs* app. This will provide extra security and assurance for users storing confidential information within the user interface.

Quick Editing & Viewing

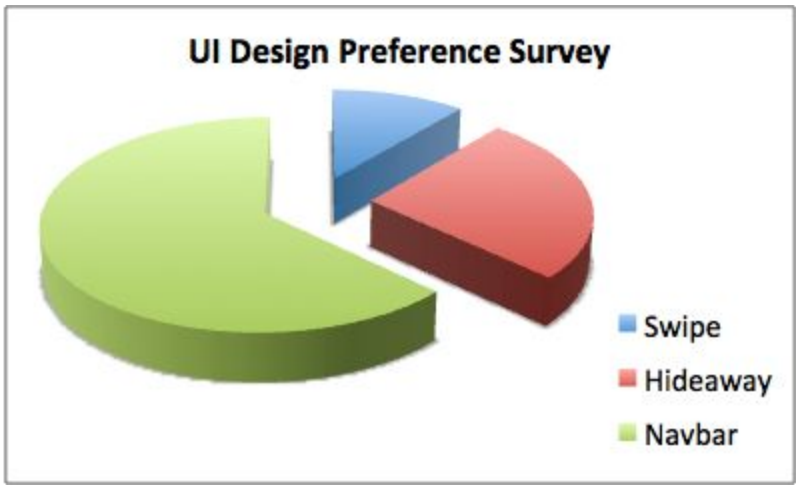
Because Scrubs could be used in an airport, or even during the traveler's visit, we wanted the user to be able to view and edit their information quickly. In order to do this, we organized the information first by logical category. Personal information about your state in life is organized in the *Emergency/Profile* page. Data about each trip is stored in a dropdown format under each destination and the dates of travel. Organizing the information this way will allow the user to quickly see their current information. We also wanted users to edit their information on the fly, so we enabled inline editing into the design.

III. Design Summary

After designing three alternatives in part 2, we wanted to see what was actually most comfortable to the user. In order to evaluate this, we shared our mockups of each alternative, and asked them to choose the one of most comfort. Out of 27 participants, 17 said that the traditional navbar layout found on iOS apps was the most intuitive for

them. This is easily the majority, and had huge implications to move forward with Design 3 (Navbar) for our final prototype. The table containing our data and a visual pi graph has been included below.

UI Design Alternatives	Ease of Use Preference Count
Design 1 (Hideaway)	7
Design 2 (Swipe)	3
Design 3 (Navbar)	17



We felt that there were many advantages to this particular design. One of the primary objectives was keeping this application simple and easy to use. This is important in most applications but we felt as though it was particularly essential to this because there may be situations in which the user is using the app at less than 100% of his or her ability. This could be due to illness or being dazed due to an accident or any other issue. This emphasized the importance of keeping it straightforward therefore we chose a design with a limited number of screens. We also chose a design that we felt best fit the conceptual model of an app. This was necessary because there will be times when in a foreign country the user may be incapacitated and someone else is attempting to use the app to help the user. This is why we could not heavily rely on recall when designing our interface. Their ability to use functions will be limited due to obvious security and privacy issues but it is important for them to be able to access certain information. This does not allow for time for the stranger to learn how to use a new app. This is why using a basic user interface is essential. Our assumptions were confirmed through the UI design preference survey.

The design uses the Gestalt principles heavily. On all the screens for example the trips screen we used gridding heavily as well as similarity and proximity to clearly distinguish between the headings and the information regarding each trip. We also used these principles on the emergency screen. Similarity allows us to determine well which information goes with what response. In addition to Gestalt principles many other design principles were taken into account. On the trips screen the color of the selected trip changes to red so the user can clearly see which trip they are viewing. The navbar at the bottom has icons that fit the conceptual model of what those icons mean such as the magnifying glass for search. This should allow the user to quickly know what they are looking for. Many of the screens are red because the color red is often associated with the medical field and emergency situations. The logo is a suitcase with a health cross inside. This is to emphasize that this application is for medical assistance while traveling.

The security was also a major point of emphasis in selecting this design. The information contained in this app is very personal, so there were many measures taken to keep them safe. In addition to the traditional username and password we have included a pin that the user must also input to access the app. The pin must be input if the app is not in use for over a minute. This is an added security measure. An alternative to the pin is the option to use a fingerprint scanner. Combining security with providing anyone necessary medical information to help the user when the user was a difficult issue to overcome. We solved this by allowing the user to select and choose what information they were willing to display to anyone. This means that a stranger trying to help the user can press a button on the login screen this allows them to access the information that the user chose without them logging in. This can include basic information such as allergies and whether the user is prone to certain issues such as seizures.

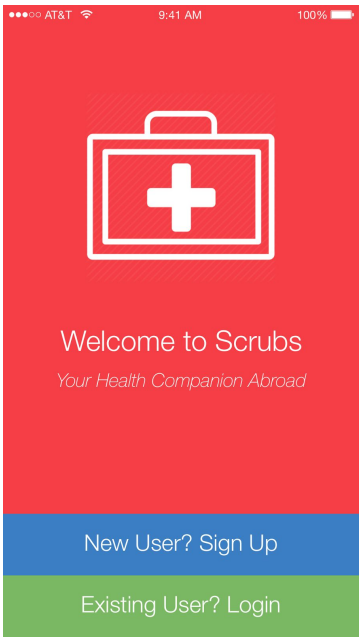
A user's medical record is constantly changing with new vaccinations and new conditions, so we deemed it necessary to give the user the ability to edit their information. The user was given many options to edit their information in the app. He can allow their doctor to upload their files, he can upload them using the app on their mobile device, he can use the URL to upload files, and he can use any combination of the three.

IV. Detailed Prototype Demo & Description

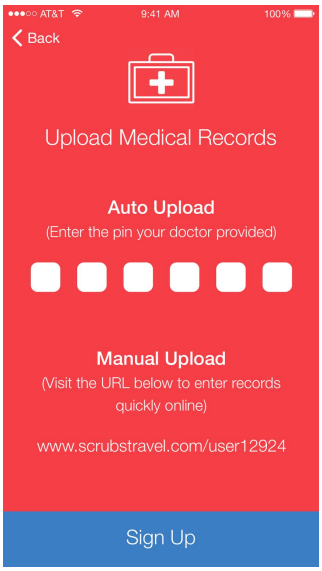
Link to Prototype

The Scrubs mobile application is very easy to use and navigate to get access to quick information before and during traveling. Because of the nature of our requirements, Scrubs needs to be very secure and universal across different cultures, while still being very quick to navigate in case of emergencies. Thus, many of the UI/UX components in

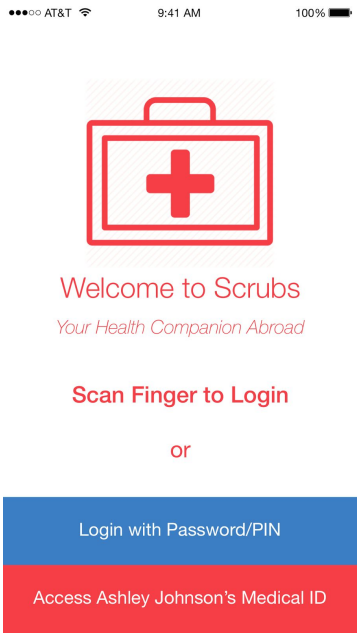
our prototype take this into consideration to ensure a universally safe and intuitive interface for the user to interact with.

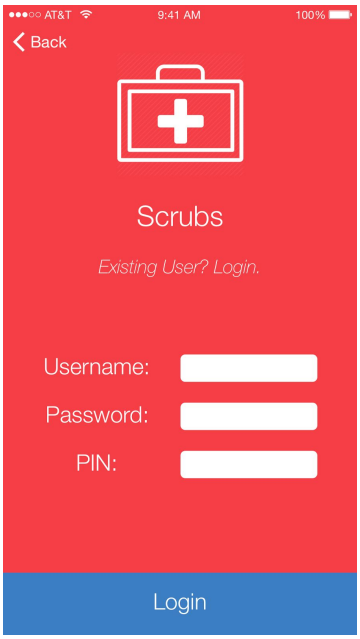


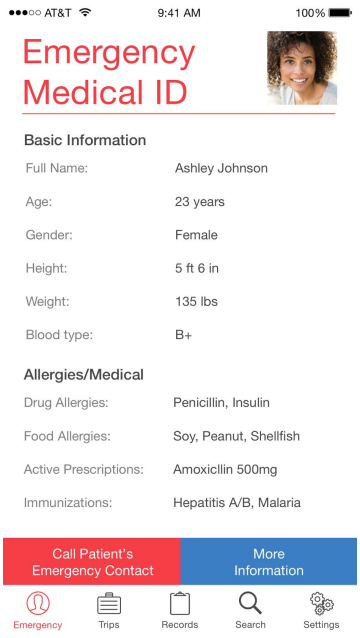
The moment a user opens the application, they are greeted with a momentary loading screen with the Scrubs icon. Then, depending on if they are a first time user or returning user, the appropriate welcome screen displays. A first time user will be greeted with a welcome screen that prompts the user to either Login to an existing account or Sign Up for a new one. If the user has a Scrubs account but is not logged in on this device, they can click Login to be prompted for their credentials. If the user choses to Sign Up, they will be taken to the screen that allows them to enter in their basic health information. After completing these fields, they would click next to go to the second Sign Up screen where they can upload their full medical records from their doctor or chose to enter their records manually on a desktop computer. After completing this, the user clicks Sign Up and is taken directly inside the application where they can start adding and editing their trips and records.



If the user is already signed in to the application and is a returning user, the alternative welcome screen displays after the initial loading screen. This welcome screen allows the user to scan their finger using Apple's Touch ID authentication system to enter the application. If Touch ID fails, there is also a button that takes the user to the Login screen where they can enter their Username/Password and PIN manually to enter the application. The third option on the screen allows a third party to view the user's Emergency Medical ID card which contains the most important information authorities would need in case the user needed medical attention while traveling abroad. Clicking on this button takes the third party directly inside the application to the Emergency Medical ID tab. Clicking on any other tabs prompts the party to login as they only have access to the emergency portion of the application.



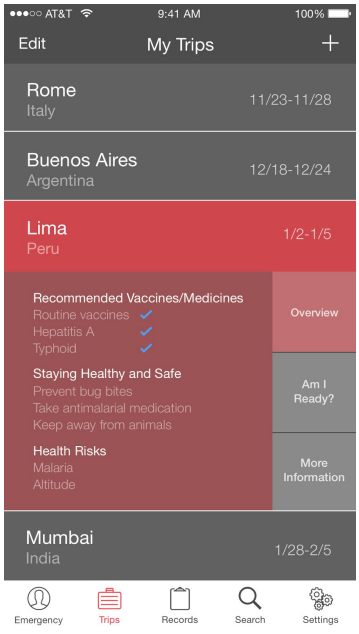


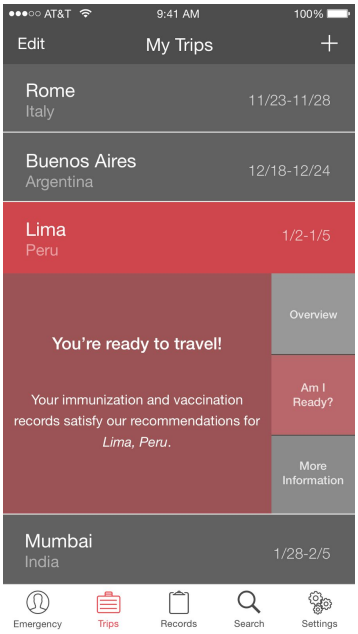


Once the user is logged into the application, they have the ability to cycle through numerous tabbed views which can be changed by clicking on the icons in the Tab Bar on the bottom. The first tab (Emergency) is where the user can view their Emergency Medical ID and is also the screen a third party would be taken to in case of an emergency. This view contains important health information and an option to call the user's emergency contact as well as an option to view more detailed medical information about the user.

The next tabbed view (Trips) is the central location for where the user adds and edits their destinations. Here, the user can view their destinations in a date-ordered list view that allows them to have a quick glance at their upcoming itineraries. Because the destinations are date-ordered, the most upcoming trip is on the top to make it easier to

quickly access information about this destination. Clicking on a trip expands a submenu below it with 3 options for viewing information on the left(Overview, Am I Ready?, More Information). The first option “Overview” displays important medical advice and vaccination information relevant to the country. The next option “Am I Ready?” tells the user if their recent vaccination and immunization records satisfy the recommendations for the country or not. The third option “More Information” gives the user more detailed information regarding health safety in the country. Clicking on the same selected trip will close the submenu while clicking on another trip will directly take you to the sub-menu of that trip. Editing your list of trips is as simple as clicking Edit on the top left and then choosing which trips you would like to delete. Adding trips is just as simple as you click on the plus symbol on the top right and enter the name of the city you are traveling to to add it.



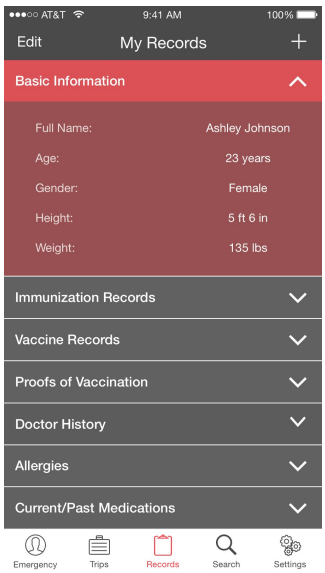


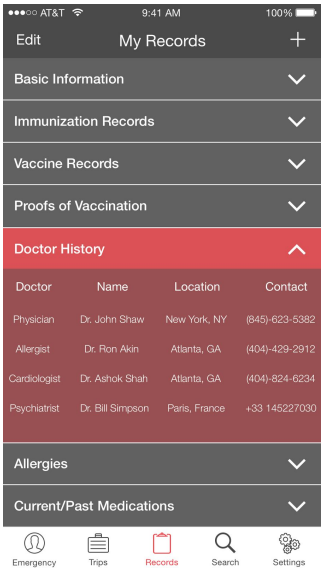
The third tabbed view (Records) is the central location for the user’s comprehensive medical profile. Here, they have the ability to edit, view, and add to their Scrubs medical profile. Using the same list view with sub-menu model as the previous view, the user’s medical records are displayed under 7 main categories. Clicking on a category expands the sub-menu view which displays the medical information. Clicking on edit or add will allow you to perform those respective actions directly in the list view. Because all of the functionality occurs directly in the listview, it is very easy for the user to view and manipulate their detailed records quickly. Similar to the previous Trips view, clicking on another category will directly open its sub menu and clicking on the same selected category will close its sub menu.

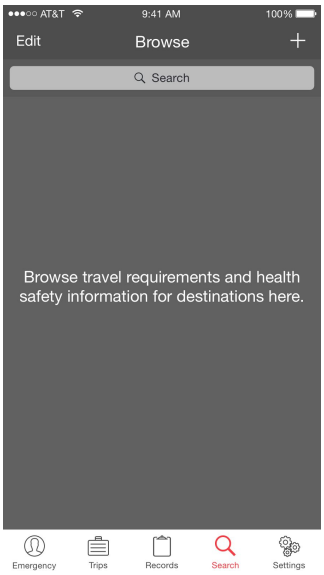
The fourth tabbed view (Search) allows the user to browse the travel requirements and health safety information for any destination they search for. It is simple to use and

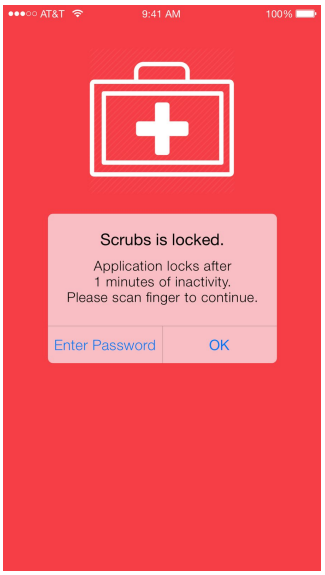
contains only a search bar where the user enters the destination. The space underneath will then be populated with relevant information to that destination.

If the user is inactive in the application for more than one minute, an inactivity page will fill the entire view. The user will be prompted to scan their finger or login again to ensure high levels of security. After authenticating one's self again, they will be returned back to the last screen.









V. Evaluation Plan

As outlined above in the requirements, our application has a very specific purpose and market for the user. Because of this, we need to meet our usability requirements and also have a plan of action to evaluate them for our prototype and final design. Below I have detailed an initial evaluation plan broken down by each of the core requirements for the *Scrubs* application.

Limited Number of Screens

The first requirement was to limit the functionality of the application and the interface to make the experience as simple as possible. In the requirements we wanted all major actions taken by the user to be accessible from any screen in three clicks or less. An initial evaluation plan for this would be to list all the major actions of the application like creating a profile, adding a trip, updating personal documentation, and editing contact information. To evaluate the truth behind this, we will have the user start in all key areas of the application, and ask them to perform one of these core actions. An example plan of this is in detail below. By evaluating the user performing these actions we can measure the amount of clicks and the overall time it takes to navigate the application.

Starting from the login/splash screen of Scrubs, measure the amount of clicks to perform the following actions:

- Editing contact information on their profile
- Creating a new trip and adding it's details
- Deleting an emergency contact
- Adding new immunization records
- Updating their current doctor's contact information

These are just a small sample of the core functionalities that could be tested, but this provides a wide variety to measure the amount of clicks (touches) it takes to navigate *Scrubs.* This same test could be done from a different initial location, like the Emergency/*Profile* page, or the *Records* screen.

Not only measuring how the user engages the app, we could also survey our customers on the simplicity of using *Scrubs.* This could involve giving the participant a goal like creating a profile, or making a new trip, and allowing them to complete the goal with no help or interruption. Afterwords, we could then have them take a questionnaire measuring their experience on completing the goal within the *Scrubs* interface. A sample questionnaire has been added below to give an example of how to measure a specific aspect of the interface. Multiple surveys would need to be used to evaluate every aspect of *Scrubs,* and then the feedback would be analyzed. However, getting the user's

perspective after they have used the application would best guide our judgement if the interface in fact limits the amount of screens.

Simplicity of Screens Survey

1. Were you able to navigate to the task in three touches/clicks?
2. Did each core action resemble a common task?
3. Did you see anything about the interface that seemed unnecessary?
4. Were you able to find your task or a similar prompt in the app?
5. Any thoughts on the overall layout of the application?
6. If you weren't able to navigate the interface in three or less touches/clicks, what distracted you from the objective? Curiosity? Confusion? Similar naming for actions?

Support Countries across Globe

Another core requirement would be to provide support for a majority of the countries across the globe. Evaluation plan of this metric is easy as we can calculate the ratio of countries we support in a continent to the total amount of countries in the continent. We obviously need to make special metrics for continents like Australia and Antarctica, which are huge regions with no smaller countries. For those continents and also Oceania, we will define a metric on supporting 75% of the populated regions.

This metric is a great way to measure our breadth, but we will need a plan to evaluate supporting the regions that our popular travel destinations. For example, we wouldn't want to support Kazakhstan, while meeting our 75% goal, but neglect to provide medical requirements for India. Therefore, we need to support every country possible that has defined medical requirements. If that's not possible for some reason due to monetary or legal constraints, a rating system should be used to evaluate our current support of the world. This rating system would take into account the nation's population, transportation system, global economic influence, and amount of visitors. We then could survey a vast sample of participants asking them their home country, what destinations they visit frequently for vacation and work, and what nations they would like to visit. We have provided a sample survey below detailing how to measure the importance of what countries need to be supported.

Global Support Survey

1. Where is your national citizenship?
2. Have you ever left that nation/region?
3. Do you travel internationally for work, pleasure, or both?
4. What are your top three travel destinations for work?
5. What are your top three travel destinations for pleasure?
6. What are three places you would visit if money was not an issue?

7. What five nations/regions do you hear about most in the news, social media, and from entertainment?

From this survey, we can measure if *Scrubs* is supporting the globe that is beneficial to the customer base. Participants from this survey would have to be uniform based on their country/region of origin, race, and average income.

Security

One of the most important aspects of our application is making sure our customers are comfortable providing their confidential information to *Scrubs.* To evaluate our security measures, the actual working prototype (with a backend and database) would have to be extensively tested and stressed. This however is beyond the scope of our class, but we can still very much evaluate the security of *Scrub's* user-interface.

Right now, we currently require a username and password to log into application (which is pretty standard), and also a PIN number. This PIN is used to give a third level of security to one's ID, and also provide access back into the application if it stays stagnant for more than a minute. To evaluate this strategy we thought that feedback from potential users would be very helpful on if they would find the PIN security more comforting. Below is an example of the questions used in the survey, but we really want to measure the level of comfort for the user. The amount of lockout time from the application can also be adjusted (like the iPhone lock settings) if the user wants it after five minutes, or maybe every time they open *Scrubs.*

Scrubs Security Survey

1. Are you comfortable giving an application access to your health records, social security, and contact information?
2. Does requiring a PIN on top of a username and password make you more at ease storing your personal information?
3. If so, how long would you want to be locked out before *Scrubs* prompts for your PIN?
4. Is one minute of inactivity annoying for you to re input your PIN? If so, what would be your preferred time of absence?
5. If you are still not comfortable revealing your personal information to *Scrubs*, what level of security would you feel comfortable with?

This survey should allow our team insight into the customer's overall comfort level providing their pertinent medical and personal information. This should give us a metric to evaluate the current security of our application, and to measure if we are fulfilling our initial requirements.

Quick Editing & Viewing

The last requirement we had was quick editing and easy viewing of data within *Scrubs.* Evaluating this could conclude some research experiments of having the user interact with Scrubs in a stressful or distracting environment. Evaluating the user perform an action while walking around the Atlanta airport or in a timed situation would show how flexible the application is to the user's environment. Below I have given two examples of measuring a participant's ability to perform an action within *Scrubs* during a stressful situation. In order to avoid bias in the user's ability to handle technology in timed environments, the participants would have to come from a variety of background and chosen at random.

Update Emergency Contact Information while walking through the Atlanta Airport

- Give the participant a starting gate, reasonable time limit, and ending gate to finish
- User must complete the task on *Scrubs* and reach the gate before their next flight departs
- Survey the user about the experience and the stress they felt trying to complete the task on the application in a crowded airport

Add a new immunization record on the Records page in under five minutes

- Participant starts with a dummy profile and is given a quick walkthrough of *Scrubs*
- They are given a record already in the system to add to their profile under immunizations
- Must complete this task in five minutes
- Surveyed afterwards about the experience and stress to finish in the allotted time

There are many more actions that could be tested, like updating one's email, phone number, or past trips. However, the important evaluation is to measure this metric under stress and time constraints to see if these actions are simple. This will require having a uniform sample of participants so that bias from past experience and overall intelligence will not influence our evaluation.

Overall, our evaluation plan is to effectively determine if *Scrubs* is meeting the core requirements outlined above. We plan to do this using a combination of surveys and benchmark tasks/objectives for the participants. This will give us feedback on how the user navigates the interface to perform the task, and also their opinion on the difficulty completing the objective. Recording these results with a uniform sample of participants should allow our team to evaluate *Scrubs* and make any necessary changes if we are not meeting a core requirement.

VI. Summary & Reflection

As in previous phases of this project we learned how to successfully implement key concepts and principles from class into a testable design. For example, the prototype has a heavy emphasis on Gestalt principles. All of the pages within the application concentrate on using a typographical hierarchy for displaying the key information for the user. This was combined with similarity and proximity to enable a user friendly application. This is just one example where we actualized a concept we learned in class. But how we accomplished this is also very important. We used two mockup software technologies to create our app. The first was *Sketch* to design every aspect of the application and create the static mockups. Then we used dumped those mockups into *Invision* to bring the designs to life and create our prototype.

There were many issues we had to deal with while implementing our original design into a workable prototype. One of the things we did not build was a web/desktop interface allowing the user to input their information manually using a computer. After they uploaded their files through the desktop interface, these documents would be stored to their profile and would appear on the mobile version as well. However, we were not sure how to connect the desktop URL to the mobile app in terms of design and the prototype. The desktop design would allow the user an easier platform to upload any necessary medical files and determine what would go on their profile. They could also determine what facts are shown on their emergency page. This was something we found we wanted to do because although the mobile app could be used to do all of these things it was a much less efficient way to accomplish these tasks.

A major issue was to try to make the app in a way that someone in an emergency situation would be able to use it. This was difficult because there was no effective way for us to feel how someone in an emergency situation would feel. How that person thinks and acts is going to be very different from someone just operating in a normal environment. In our attempt to overcome this we just used our design principles and what we learned in class to attempt to create the simplest and most straightforward approach to use interface. It was our attempt to create an interface that used minimal recall because when faced with a potential life threatening situation a person may not be able to effectively remember how to use an app. We wanted a design that focused on recognition and the user's conceptual model of an app.

In making our prototype almost as important as the functions of the application was making sure that it is secure. A user's medical information is among their most private and sensitive information. So we had to emphasize how to keep everything easily accessible and secure. We did this by adding a PIN in addition to a username and password on the login screen. Also because this is a medical app, we felt that users are not likely to just browse it for an extended period of time, they are likely to perform their

task and close it. Therefore, we decided to have the app lock after a minute of inactivity. The user will then type in their pin and the app will open back up to what they were previously viewing.

We feel the interface we have chosen works better than the hideaway menu and the swipe interface. The hideaway menu and the swipe menu have advantages regarding the physical space used on the screen, however we feel that the advantages in space saved are not enough because there may be users unfamiliar with those interface styles. That could lead to more confusion or stress particularly in a dangerous situation such as a car crash, which would defeat one of the purposes of the app which is to allow people to be calm and helpful in emergency situations. Because of the nature of the app and the situations in which it can be used we decided that meeting the user's conceptual model and keeping our design simple was more important than saving space.

Finally, even though we have defined a prototype and design style of the application, our team needs a plan to evaluate if the final product will indeed meet our requirements. We defined an evaluation plan that breaks down each of the core requirements and explains how and why this should be tested. Each core requirement aligns with the goals of the application, and brings *Scrubs* to a standard of providing an amazing user experience. For every core requirement we plan to do survey questionnaires and benchmark tasks/objectives for the participant to gage the standard. We have provided sample survey and also objective plans for the participants to engage in *Scrubs*.