

Personal Project 1

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Credit to
<http://designmodo.com>
For tablet app perspective mockup

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Initial Concepts

To begin with, I have brain stormed initial ideas and looked into a select few in more detail in order to gain a solid idea and aim for this project.

Idea Generation

To get started with some initial ideas I have created a brainstorm of my initial thoughts. I have really struggled with finding an idea that I am confident will be a good area to pursue.

I have thought about many aspects for this project, from new technologies to every day problems that need a solution.

To the right is the mind map that I have created with my initial ideas. I have reviewed my options and decided to explore a few ideas in more depth to get a more detailed view of where I could go with this project.

On the following pages I have created more detailed explanations, outlining the problem, scope, technology, innovation and value of the projects.



Initial Concept Idea #1

FindMyBand -

Problem

This application idea would bridge the gap between musicians and locating a local band to join, or locating other local talent. Currently there is a severe lack of apps like this one, I have found one similar but its functions are lacking in many ways. This application would allow the users to create a profile, to showcase their talents and to advertise themselves on the platform. Users could also create adverts for bands that users could view and link the advertiser to their profile, asking them to view it.

Scope/Audience

This application would appeal to people 16+, as this is the average age of musicians looking for bands, it will however still have to be easy to navigate and use, as there will be older users who wish to find a band.

Technology

The possibilities for integrating new technologies into this is slim, however i have a few ideas that could be of use. One of these possibilities is augmented reality, this would enable the user to hold their phone up and see nearby users who are looking for a band, or possibly nearby adverts for bands. The user would then be able to click on these adverts to see more information and get in contact.



Innovation

This project would be innovative because there is nothing like though out on the market, especially not including new and exciting technologies! This would make it more attractive to users and also will add additional functionalities to make the application more useful.

Value

The value of this project would be to give users a quick and easy way to locate band members, and also to make sure they are getting the right person. The user would be able to showcase their talents and advertise themselves to find the right musicians

Initial Concept Idea #2

NHS Patient Care app

Problem

The NHS is a service sector that is severely lacking in up to date technology. Currently all patient files are stored in physical archives, this leads to secretaries having to locate the files and transport them to doctors for when they visit patients. This is time consuming and also pointless considering all files are typed up to begin with and are in digital format. A solution in which all files are kept on a server would be ideal. Doctors could get patient information immediately when they stand next to their bed.

Scope/Audience

This idea would be aimed at qualified doctors or nurses who as we all know are already struggling for time, they are overworked and underpaid, having a new technology system in place would save time and money.



Technology

All of the points mentioned in the 'problem' box could be solved with the use of iBeacons, a beacon placed on the bottom of a patients bed could send information of the patient directly to a doctors iPad/tablet, and an app could be developed to allow them to edit these notes and share them with their staff whom it may concern. Also iBeacons could detect when a nurse/doctor is going to walk through a door and so they would be allowed access due to having an app.

Innovation

This project would be innovative because of the addition of iBeacons in patient care, there is the need for a more digital service to be implemented and so this could be the answer. It would be a cost effective method of reporting and keeping files up to date.

Value

The social value of this project could potentially be huge. Some of the main complaints in the NHS are from poor patient care, patients feel disconnected from the doctors and part of a system. Having a system such as this put in place would greatly benefit all involved.

Initial Concept Idea #3

Advert Spot -

Problem

A third idea of mine is a new and interactive way of advertising. This would involve a company creating a small “spot” in a public place and placing an advert, probably an image stuck on the floor. When the user walks into this spot, they would get push notifications about the advert. Then if they wanted to go further, the user can use augmented reality to view the nearest store that sells the product being advertised, along with possible deals.

Scope/Audience

This idea would appeal mostly to older teenagers to mid 20's who are regular shoppers, This idea could be a complete nuisance, but maybe the advert could only be activated if the user is on their phone when they walk into the trigger zone?

Technology

This idea would use two types of new technologies, one being augmented reality, and another being iBeacons. This would enable the user to receive push notifications when walking into the “Spot”. The iBeacons could trigger sound or videos to play on the users phone instead of having a text description.



Innovation

This project would be innovative because it is a new and interesting way of advertising a product. It will create a sense of mystery and excitement with people who have no idea how this has happened! Also the use of new technologies in this field is not massive.

Value

The value of this project would be a new advertising platform for businesses and also a way of consumers gaining deals that they would have otherwise never known about, saving them both time and money!

Initial Concept Idea #4

Interactive Kitchen bench

Problem

Many people struggle with creating meals and the timing of doing so. This idea would aid with both of these and be the first step towards a “smart kitchen”. This Interactive bench would recognise ingredients the user places on it, and also aid them in the creation of meals with built in recipe guides taking them step-by-step through the creation of meals. The bench could also recommend meals based on the ingredients placed on the bench.

Scope/Audience

This idea would appeal to students who are needing quick meal ideas and also a little hand, or it can also appeal to the seasoned chef, someone who loves to cook and would like an interactive interface to help them organise and create meals.

Technology

This idea would use a touch screen interface to allow simple gesture user interaction. The bench would recognise what ingredients have been put down either by a bar code scanner, or maybe even NFC, if this would be implemented into all food packaging. This would be the most effecting way, as the ingredients could then be placed anywhere and the bench would recognise them.



Innovation

This project is innovative because there is no interfaces like this, also the thought of an interactive helper in the kitchen would be a great help to many people. Also the integration of these new technologies would be a step towards a world in which everything is connected.

Value

As I have mentioned before the value for this project would be time saving and also it would make the cooking experience more enjoyable and inevitably safer. Many people get easily stressed in the kitchen and so this could be a possible solution to this problem, if it works seamlessly.

Initial Concept Idea #5

iBeacon Festival App

Problem

Every year, thousands of people flock to festivals all over the world. These festivals tend to be difficult for our generation, as we are accustomed to having constant connection to internet services and also a constant stream of information through our personal devices. However in a festival, there tends to be little or no connectivity. People lose their friends, tents, and have no idea where they are in general. I believe this problem can be solved by looking into iBeacons and their use in a situation such as this.

Scope/Audience

This idea would appeal to a wide range of people, from the younger generation who enjoy festivals to the adults who are still chasing their teenage years. The application would aid not only these people but the festival organisers as well, as they could gain information and stats from the use of iBeacons, they can see the spread of people and the most popular places over the event, this could aid them in future planning, saving time and money.



Technology

This app idea would use the new technology of iBeacons. These are small devices that are cheap and easy to install into places. The beacons work from bluetooth which means that in a festival situation where there is little signal, the users would still be able to retrieve information about where they are and updates depending on their location within the venue.

Value

This project would bring the festival experience up to date with current technology, making people overall more satisfied and less cut off from the rest of the world. It will make those at a festival feel more part of a community with constant help and support.

Innovation

This project is innovative because it is taking a current problem and solving it with some new and exciting technology. There are many possibilities with iBeacons and so this project has many routes to explore. I believe that it is an informative and interesting solution to an ongoing logistical problem.

Concept Research

I have decided to take forward my concept idea of an application communicating with iBeacons to aid NHS doctors and nurses. I feel that this is a real world problem that needs to be addressed. The whole system of patient care and reporting is incredibly outdated and could do with help from new technologies.

Background Information

Background

Currently in the NHS, the documentation of patient care is a lengthy and time consuming process. As it stands, all medical notes are stored in “medical records” departments across NHS hospitals. These notes comprise of a patient details, medical history sheets, patient results and clinical letters. The majority of these notes are already digital, yet are printed off and stored, and any notes made by doctors on wards or in clinic are later typed up by secretaries. Each time a doctor sees a patient, these notes need to be retrieved, which alone is a complex task. And then when complete they have to be again returned to medical records.

The Problems

This current paper-based way of operating is not practical. The whole logistics of the system is time consuming and complicated. The constant passing of information makes it easy for patient notes to be misplaced, regularly going missing and having to be tracked down, taking up valuable time. This causes anger with doctors as they do not know the patients history when they see them, this can make the patient feel disconnected and almost part of a system. Another huge risk with paper based notes is the risk of infection transmissions, which is constantly being highlighted amongst staff.

The Solution

The solution would be a simple and intuitive application that would allow doctors/nurses to view, edit and share patient information whilst on the wards. This would be achieved through a tablet application with the integration of iBeacons. The beacons would be worn on the patients wrist and when the doctor walks to the edge of the patients bed, they will be updated with the patients ‘digital file’. This would include patient information, history and everything else needed. The doctor could then select a ‘notes’ section and begin to dictate their observations, which would then be saved to private cloud storage. This would enable doctors to gain access to patient notes whenever is needed and would save a lot of time, which is a main complaint in the NHS, patients regularly complain that doctors and nurses are always pushed for time which sometimes leads to patient neglect.

Understanding iBeacons

About iBeacons

iBeacons are Apple's new BLE (bluetooth low energy) wireless technology devices. The beacons provide a new and different way of providing location-based information and services to iPhone users. The iBeacon is compatible with iPhones running ios7 or higher, which means the iPhone 4 and upwards can be used with them. Also this technology is available for android devices running Android 4.3 and above, meaning that the capabilities of these beacons are not limited to iPhone users only, which would have been a potential draw back.

How do they work?

iBeacons are small and very cheap as far as new technology is concerned. They are bluetooth emitters, and send out a constant signal. Apps installed on the users device are always listening out for these signals and when the user comes within range of them, the users phone will respond accordingly with a push notification. The beacons also have a number of different range settings to ensure the user receives the correct information at the correct time and also to avoid two beacons sending conflicting information at the same time when a user walks into a certain area. This can especially be helpful when working in tight spaces.



What are the possibilities?

With iBeacons the possibilities are endless, most people see them as only useful for retail purposes, as they were first advertised for. The user walks into a shop, get notified they are in the shop, and subsequently receive offers tailored to them and their shopping experience, this makes it overall a more personal and interactive experience.

However in reality there is a whole lot more that can be explored when it comes to iBeacons.

One interesting fact about iBeacons is that they include micro-location geofencing. This is ideal for indoor mapping purposes, this enables the beacons to know where the user is and feed them information accordingly. GPS signals have trouble penetrating through materials such as glass, steel and other building materials, meaning that phone map applications are no good in these environments. iBeacons could solve this by connecting with each other and aiding the user. There are also a range of iBeacons which means that power will not be a problem, you can purchase beacons that plug into the mains or ones that run on battery, meaning anywhere can be mapped out, indoor or out, to a high degree of accuracy.

Companies will also find iBeacons helpful from a big data point of view, they can be used to gather data on where people are visiting the most, and so where to advertise more, the future looks interesting with these ideas.



The Future of iBeacons

The technology for iBeacons is already advancing fairly quickly, even though they are a new product. There has already been an add on that allows for more accurate location tracking for use with multiple beacons. I expect that there will be many more advancements in this technology that makes it a very interesting and fast moving area to be working in.

Hopefully within the next few years it may be possible to send files through iBeacons, for example sound, video and images could be sent to the users device as a different form of communication, instead of just text and notifications. Although it is possible for a beacon to notify you of something and then you are presented with some rich media when you open the application.

iBeacons could ultimately be the next step towards an internet of things, a society where everything is connected in some way, this could lead to more efficient lifestyles and a world in which the user is constantly getting the best options available to them.

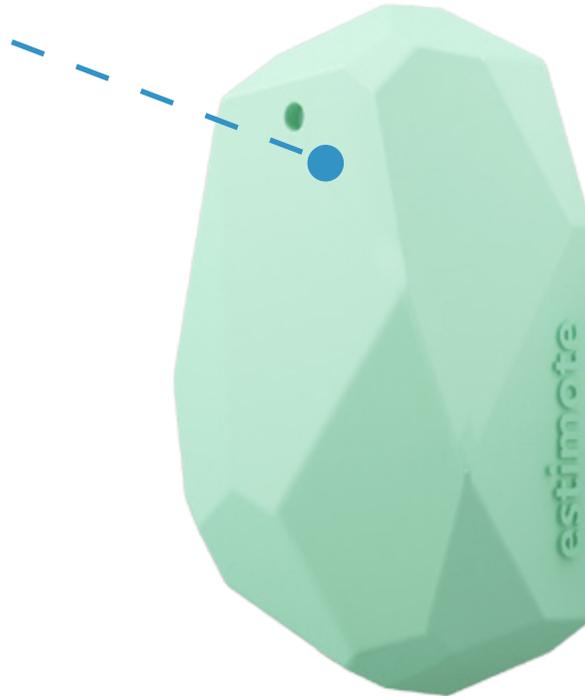
The advancements in technology is without doubt something that I should take into account when taking this project further, as this could open alternate paths along the way.



What's inside?

- A look at the more technical specifications of the iBeacon
(Estimote iBeacon has been used as an example, size and shape do vary in other models)

Soft outer shell to protect the inside components.



Nordic nRF51822 - the newest generation of Bluetooth Low Energy chips from Nordic



CR2450 battery from Panasonic - Long battery life



Harder rubber, flat bottom to allow the beacon to be attached to various surfaces.

NFC vs BLE

What is the difference?

NFC is short range communication technology working on RFID technology. The technology is currently used in parking meters, train tickets and movie tickets. iBeacon is different in a few ways, the biggest and being the range. iBeacon does not need to put devices in close range to carry out tasks. It can be effective from as far as 50-150 feet away. This feature will enhance shopping and any other experiences as it does not require the user to literally touch their phone up against the product. Although this possibility is available, it is without doubt better in most cases to have information sent if you are a few steps away.

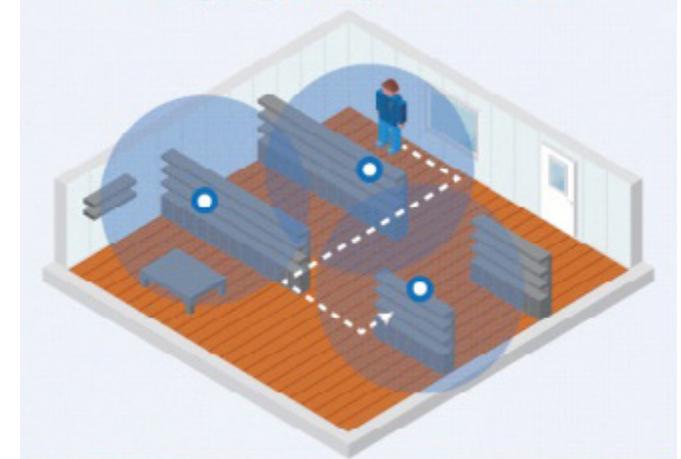
What about the price?

Surprisingly, the more advanced technology here is actually the cheaper option, by quite some distance. A nice way of visualising this cost difference is if you imagine a store that is about 1,700 square feet in size. iBeacons range is 50 meters. Therefore, the store would need one beacon at a minimum. Estimote is currently offering selling 3 beacons for around \$99.

If the same store wanted to use NFC instead, it would need to put 10-cent NFC tags on every product. That means it would pay \$100,000 for NFC tags to put on 1 million products.

Furthermore, relating to the previous point of range, the user would have to physically come into contact with the product in order to have any sort of digital interaction, whereas with iBeacons you can gather information as soon as you walk through the door.

Wireless transmitter's (BLE Beacons) coverage radius varies according to signal strength. Measured in Feet.



Wireless transmitter's (NFC Tags) coverage radius is very small. Measured in centimeters.

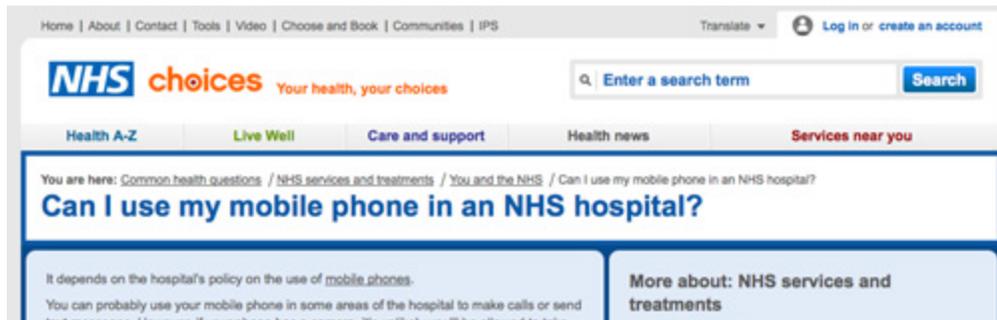


Bluetooth in Hospitals

Is Bluetooth safe in a hospital environment?

One potential drawback of this project could be if bluetooth is not available for use in medical places. As we all well know, mobile phones are usually not allowed inside of hospitals and especially around patients. I looked further into this to see the reasons behind this and also to make sure that Bluetooth is safe and able to function in this environment.

I first looked at the NHS choices website to see the guidelines for the use of mobile devices in hospitals.



<http://www.nhs.uk/chq/pages/2146.aspx?CategoryID=68&SubCategoryID=162>

Above is the page that I have read through, this page however is solely on the use of mobiles and does not mention Bluetooth at any point so I have had to research deeper into the subject to make sure.

About BLE

To begin with, the Bluetooth SIG forecasts that Bluetooth low energy technology will be implemented in billions of products within just a few years:

- Phone Accessories > 10 billion
- Smart Energy (counters and displays) ~ 1 billion
- Home Automation > 5 billion
- Health, Wellness, Sports & Fitness > 10 billion
- Assisted Living > 5 billion
- Animal Tagging ~ billion
- P2P Intelligent Transport Systems > 1 billion
- Industrial Automation/M2M > 10 billion

Furthermore, there are also some Bluetooth products that are being used in hospitals now. This makes the possibilities for Low Energy Bluetooth even more so, as these devices are constantly in a sleep mode, then when an event occurs, such as a device coming within range, a short message is sent containing information.

Bluetooth interference

Interference is the main concern for bluetooth devices in a medical environment, the fear is that important information could be disrupted or mixed up with so many bluetooth signals operating at the same time. However there currently is a 2.4GHz Industrial Scientific Medical (ISM) band for bluetooth devices in hospitals. This ensures that the bluetooth waveband will have as little interference as possible and outside information will not be transferred on this waveband. This will also improve performance by reducing latency between devices.

AFH - Adaptive Frequency Hopping

AFH is a technology used by Low Frequency Bluetooth devices to further reduce bluetooth data noise, this enables the product to continually jump to different wavebands within the 2.4GHz range to ensure data is transferred quickly and efficiently.

All of these points add up to ensure that BLE technology is safe to use within a hospital environment, and so iBeacons should be able to be incorporated into this without any problem. Furthermore the app I will be designing will mostly be tablet based, which avoids the rules and regulations surrounding the use of mobile phones in hospitals.

Reading list:

<http://www.connectblue.com/press/articles/bluetooth-low-energy-technology-and-healthcare/>

<http://www.imedicalapps.com/2010/04/bluetooth-admitted-to-hospital-healthcare-4/>

<http://www.bluetooth.com/Pages/Medical-Devices-2.aspx>

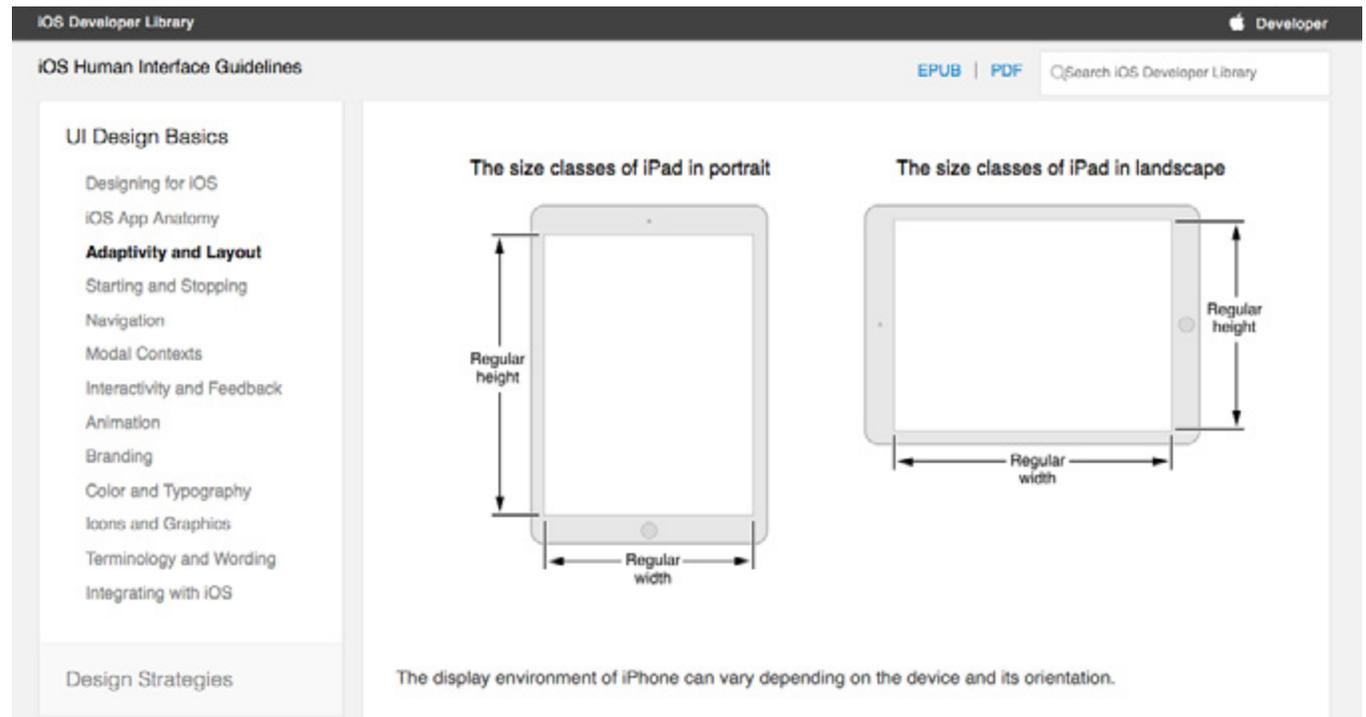
<http://www.ars2000.com/Health-Device-IEEE-11073.pdf>

IOS Guidelines

Designing a usable app

With my project relying heavily on the overall design and usability of an application, I need to look at how and why an app is designed. I have done this by reading through the apple guidelines for applications. I already have a strong knowledge of how to create apps and the general “rules” surrounding them, however these guidelines go over in more detail what is expected and how an app should be designed.

I will take into consideration and use the apple guidelines to the best of my ability to create an app that could potentially go to market and be used. The overall design and way the user interacts with the application is the most important aspect and so everything has to be as close to perfect as possible.



https://developer.apple.com/library/ios/documentation/userexperience/conceptual/Mobile-HIG/Anatomy.html#//apple_ref/doc/uid/TP40006556-CH24-SW1



Richard McMullen

Persona #1

“I’m constantly falling behind with work, maybe an app would speed things up”

Gender:
• Male

Age:
• 59yrs

Job
Occupation:
• Doctor

Nationality:
• Scottish

Bio:

Dr McMullen runs the TIA clinic at the local NHS hospital. He is a doctor that is well respected and highly thought of amongst his patients and also his fellow staff. This is mostly due to his great attention to detail. He sometimes falls behind schedule because he always takes detailed notes and makes sure that the patient is fine medically and mentally. He regularly stops for a chat and can easily get distracted. Richard has a wife and two children who are currently following in their father’s footsteps going through a medicine course at university. Richard attempts to learn how to use new technology through them, he owns a “fancy” iPhone but can’t use it much beyond the call and message functions!

User Needs:

Dr McMullen needs an application that will give him tips on where to go and an interface that will be easy to understand and navigate. It will also have to be clear with not too many colours because his eyesight is not the best, a lot of contrasting colours would not be helpful at all. He also thinks that voice dictation would be amazing and a real help!

App Knowledge



Use of Software



Feelings towards paperless system





Priyanka Aggarwal

“Patient notes go missing all the time, to have them when I need them would be a huge help”

Gender:
•Female

Age:
•34yrs

Job Occupation:
•Doctor

Nationality:
•Indian

Bio:

Priyanka is a fairly young doctor who regularly gets annoyed when patient notes go missing. She regularly requests for a set of patient notes, but they have to be tracked down through word of mouth. This is unfortunately a regular occurrence. Priyanka expects everything to be perfect, she wants everything to run smoothly and seamlessly, She wants to have the patient notes ready as soon as she gets to the patient bedside, but this isn't always the case. She has had a strict upbringing since she moved over from India at the age of 3 and so is accustomed to strict deadlines and a fast paced work environment. Priyanka is regarded as a technology whiz amongst her fellow doctors, she is an apple fan girl, owning all of their latest tech and gadgets.

User Needs:

Dr Priyanka needs an app that works quickly and provides the correct information at the correct time. She would also like the ability to take notes and save them digitally to prevent them being lost. She is confident around technology so would not have a problem adapting.

App Knowledge



Use of Software



Feelings towards paperless system





Richard McMullen

“A paperless system would minimize risk and improve patient care tenfold”

Gender:
•Male

Age:
•48yrs

Job
Occupation:
•Doctor

Nationality:
•English

Bio:

Patrick Jones is an energetic and experienced doctor who loves his job. HE believes that the current paper system of patient reporting works well but he thinks that it is probably time to move on and change to something more advanced. He believes this because “most doctors have iPads” so they would be able to bring their own into work and this would help them greatly. He has a family of 4 and so is always juggling taking his kids to school and getting to work on time his busy life-style means he hardly gets a break, an app would be a small help that would make a big different to him and his staff. Patrick owns a windows phone, yet also has an iPad, as his kids love playing on the games.

User Needs:

Patrick need an app that has a number of different sections to make sure everything is covered, he also needs there to be some sort of security so he kids cant get in and mess anything up. He needs an app that not only helps save time but also one that reduces errors and improves the connection between doctors and patients.

App Knowledge



Use of Software



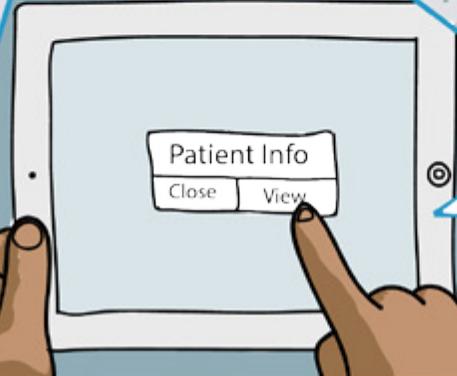
Feelings towards paperless system



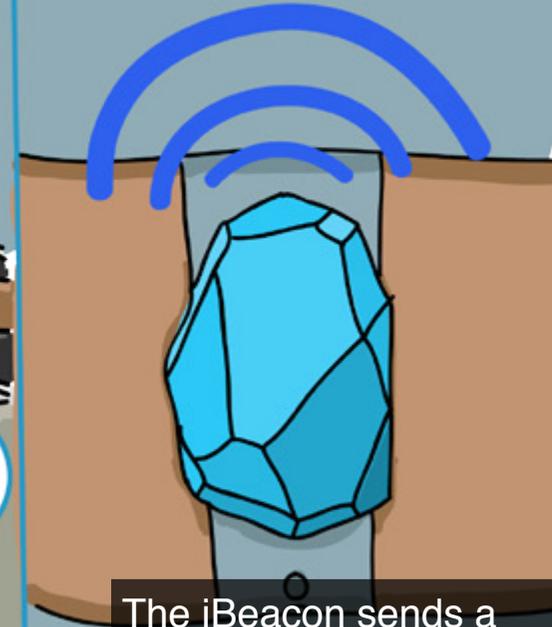
The doctor walks into the room to assess the patient.



Hi, doctor! Where are your notes, you usually have loads.



PING



The iBeacon sends a notification to the doctor with the patient info!

The doctor can now take notes on the patient and update their information



The Cloud

All of the information is saved and uploaded to a secure cloud

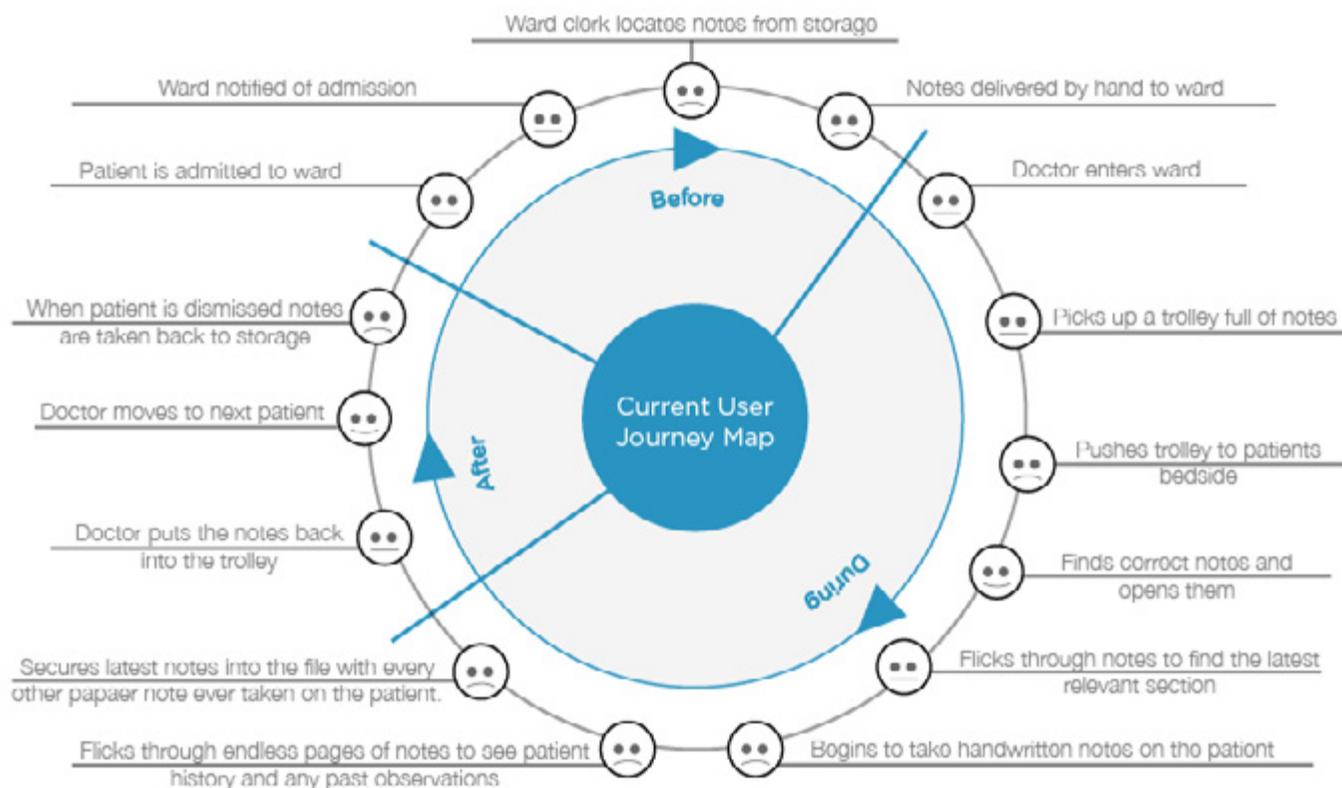


Thank you Doctor, see you soon!

Time and money has been saved, resulting in happy patients and staff

Customer Journey Map's

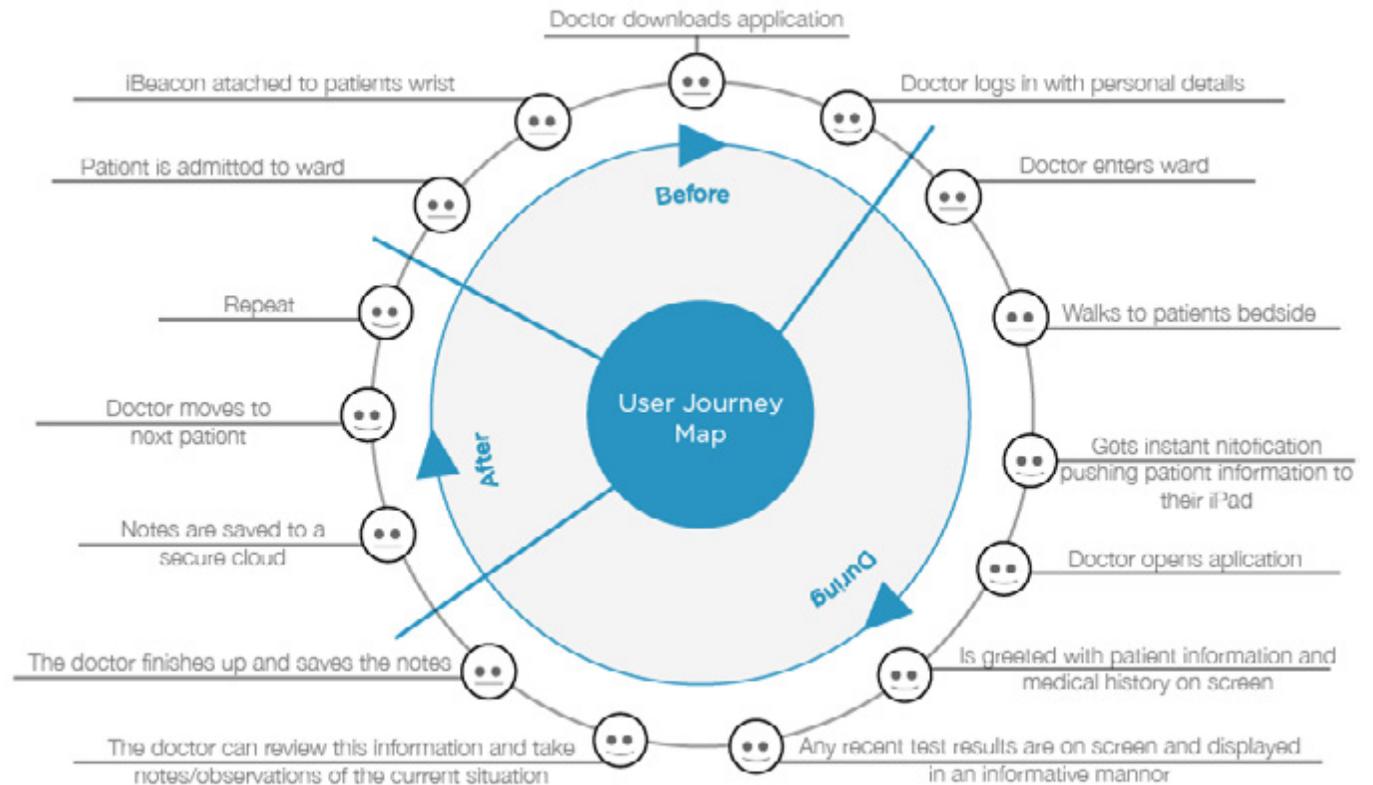
I have created a customer journey map from the point of view of the doctor, as they are one of the main stakeholders in this project. This customer journey map shows the events that take place running up to the use of the application, during the use and also after that patient has been seen. On this page I have created a customer journey map to get an overview of the current chain of events and what needs changed in order to make the whole experience faster and more enjoyable for all involved. On the next page I have created a customer journey map as a vision of what I would like my application to achieve.



As you can see from the customer journey map above, the current process of patient care is quite long and a process that can be greatly improved through the use of new technologies. I have recently spoken to an NHS nurse to get a detailed overview of what the processes are and how they are carried out, this has enabled me to center my work more around the actual user. The actual taking of notes is all handwritten at the moment which can cause confusion, this is one of the main problems that my project will solve.

Above is my future vision for the customer journey. As you can see there have been a lot of steps that have been removed because of the notes being digitalized, there is not no need to store, retrieve or return the notes, this will be saving valuable time for healthcare professionals. The correct information will be displayed at the correct time to save the doctor looking though pages of notes any time, again speeding up the process and improving accuracy.

This solution will also greatly improve the aftercare of patients and more importantly aid with complaints. Since time and dates of patient visits will be automatically logged, if a patient complains about something, it will be possible to see if a healthcare professional was at fault or if it is a bogus claim.



Current Patient Notes

What is in the notes?

Before I begin to design and develop my application, I must first fully understand what is in a patient note file. I must know how many sections there are, what each section has in it and who looks at what section. To gain a solid understanding I have spoken to a current NHS nurse who has outlined what is in the notes.

Section 1: Patient Details

This is the front page of the notes, this page includes the patients information such as Name, address, contact information, the patients local doctor, next of kin and even details such as religion. This is mostly for a patient overview and for the doctor/nurse to see who the person is they are looking after.

This Section could make up one main section in the app, or maybe be displayed as soon as the app is opened up by the doctor.

Section 2: Continuation

This section is the doctors notes section of the file. This section consists of many pages of handwritten notes that are organised according to date, with the latest on top. These notes consist of observations and anything that has been done. The continuation will make up another section of the app. This is where the doctor will be able to dictate notes and information either by typing or speech recognition.

Section 3: Results

The next section in the file is test results. This includes scans, blood tests, investigations, and other medical decisions taken that are related to these results. This is an important section of the file because it has all of the vital details.

This section in an app could include interactive graphs of patient vitals that doctors can view.

Section 4: Nursing section

The nursing section is very similar to the doctor section of the notes, it is all handwritten but just contains the tasks that the nurse has carried out, as they have different job responsibilities to doctors.

The nursing section of the app could be locked for only nurses to use to prevent information being tampered with, this could also be the case with doctors notes. Each doctor/nurse would have to log into the app with personal details so the right sections would be open to edit for the right people.

Section 5: Patient Letters

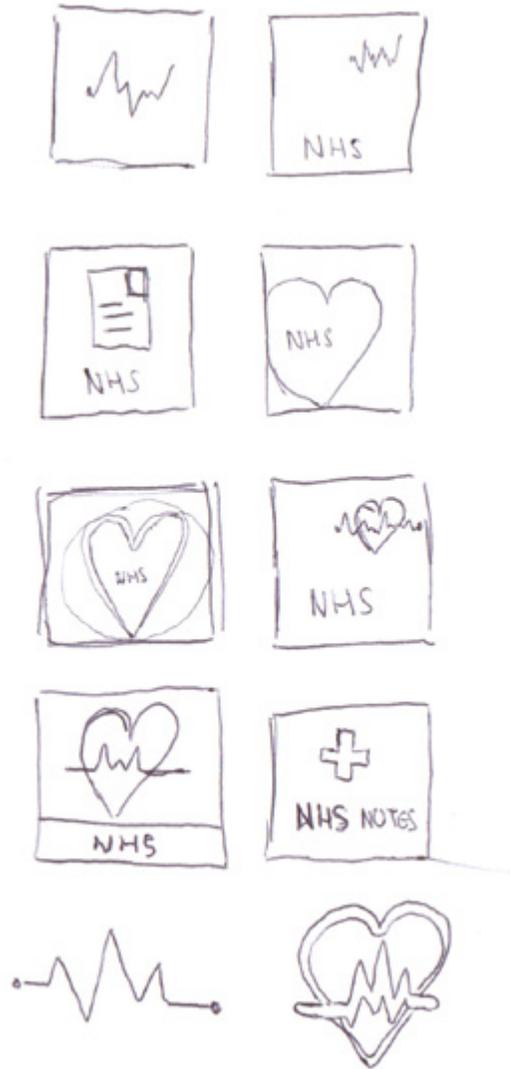
This final section includes any typed letters that the patient has been sent, or any letters sent throughout the hospital concerning the patient.

Concept Development

Now that I have carried out my relevant user research and gained a good overview of what needs to be created, I can now begin to develop the application that the doctors and nurses will use. From there I will gain user feedback through testing and reproduce my designs from there.

At this stage I have also reviewed my research and through speaking to an NHS nurse I have decided to take a more focussed approach to this project and design this application for use in stroke inpatient wards only, as tackling every hospital department would be an almost impossible individual task.

App Identity



I designed a few different app icons for use. I wanted to keep the NHS blue as a main feature throughout the app, hence the use in these designs. I have decided to use the bottom design for my app, as this is the clearer and most simple of the two. Although the top design is nice, as an app icon I believe the text may be a bit too small, and the icon that has been used is not the best. I have used the NHS logo on this design, along with the words "Patient notes". This will be the name of the application. I had looked at calling it the "patient care" app, however I think "Patient notes" is better suited, considering it will be a note-taking app.

I also want to keep the overall look of the app to be very simple and clean. This is because of the fact that it will be used in a hospital environment and so it should reflect the context in which it will be used. I will keep the use of colours to a minimum, mostly using a colour range of whites/greys and also the NHS blue colour that is found across their brand identity. These points are also backed up by the user needs, my users will mostly need a simple app that is based more on its functionality rather than its aesthetic appeal.

System Architecture

Splash Screen

Login Screen

Home Screen/
Dashboard

Patient Details

Patient details, as mentioned previously. This section would be a detailed profile of the patient with all the relevant information.

Continuation

Notes in organized fashion, in order of date. The notes could be in a tabbed view, the user then clicks on the tab to open the relevant notes.

Also This section for doctors to add notes, could click an “add new” button to create a new page of notes.

Results

All of the latest results will be displayed here in an interactive manner, allowing the professional to view and interperate them.

Also notes will be added in underneath each graph if needed.

Nursing section

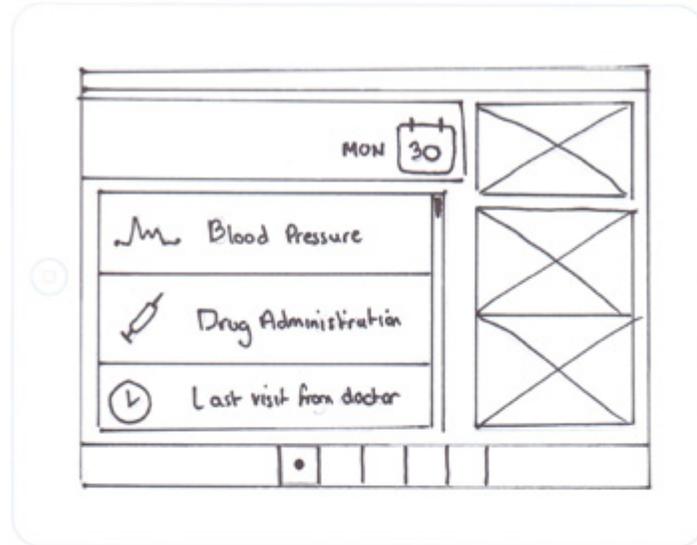
This section would be similar to the continuation. The nurse would be able to view, edit and create new notes on the patient.

Home Screen/
Dashboard

The Dashdoard section will be the homepage for the application. This will give a quick patient overview of information. Any important reminders such as drugs that are due to be administered, the current patient vitals such as blood pressure, and also the time of the last visit to this patient by any doctor. This will be a perfect way to get all of the vital information but in one quick go.

Wireframe Sketches

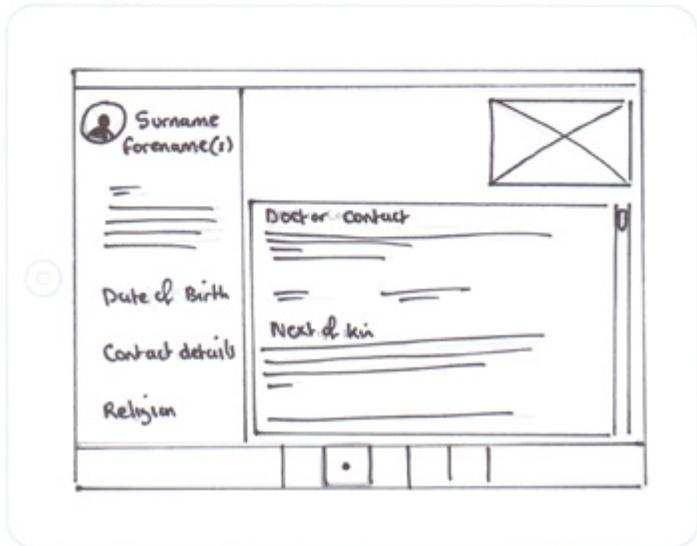
Dashboard



After I had the site map finalised, it was time to begin with some wireframe sketches. This was mainly to structure each page of the application and organize where the necessary information would go.

I began with a design for the dashboard page of the app. This design has the navigation at the bottom of the page, like on most ios apps. The dashboard page will display important information in real time, showing the user what the patients current blood pressure is. The images on the right will be scan images, as head scans are important to stroke doctors.

Patient Details

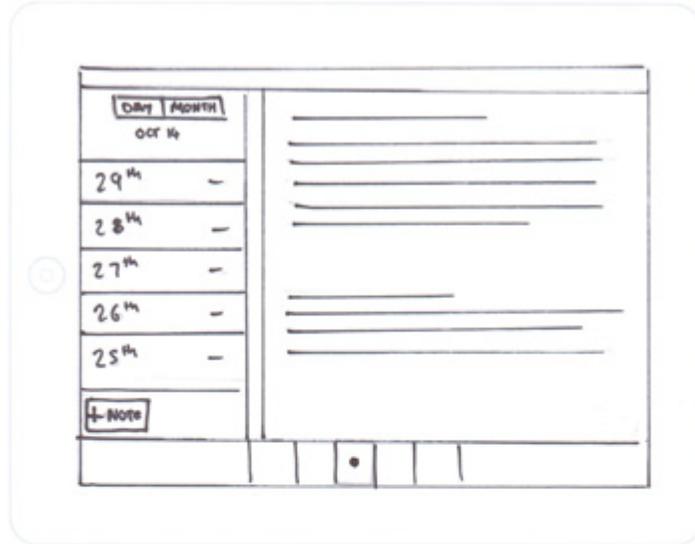


The next page that I looked at was the patient information. This page will have a sidebar to the left that shows the most important patient info, such as their name and date of birth. The scrollable area will contain less important, but still necessary information, such as the patients next of kin.

These first two pages have been designed with the HHS logo in the top right, as this is standard for NHS material, such as websites. However I believe this is just taking up space and is not needed.

Wireframe Sketches

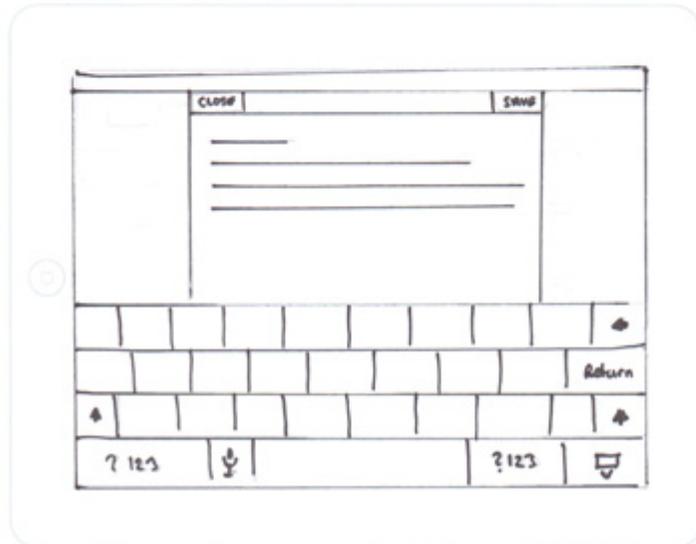
Continuation View notes



Next is the continuation notes page. This is where the doctors will be able to navigate through and search for past notes that they may need to look at, and also take notes.

The latest notes will be displayed in the main content area, with a scrollable list of dates to the left. This will allow the user to locate a day if they need to, and read the notes taken then.

Continuation Create new note

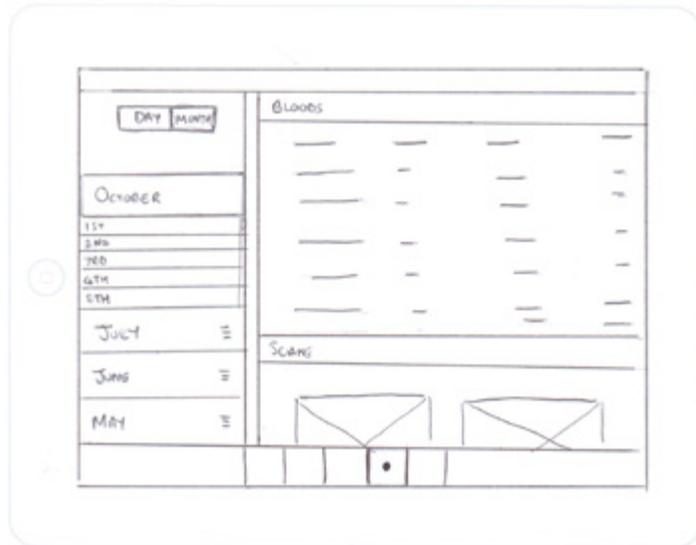


The option to create a new note will be at the bottom of this list, where it is still clearly visible. This will however need to be user tested to ensure that it is a good location if this wireframe is used.

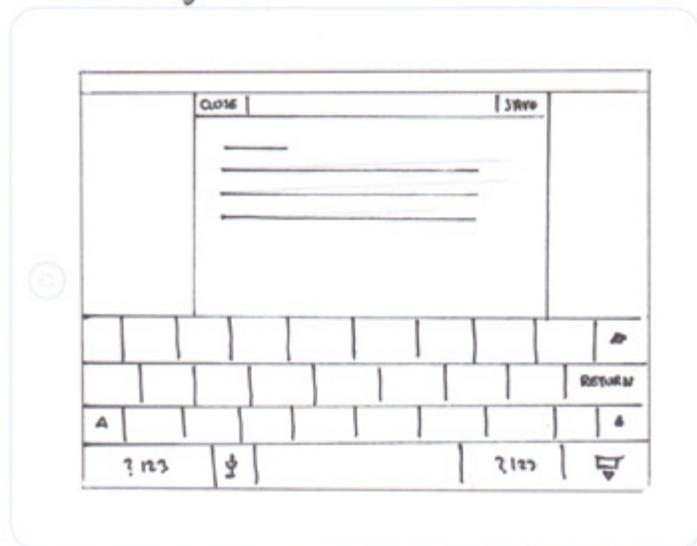
Once the user selects “create new note” the keyboard will pop up along with a box to type in.;

Wireframe Sketches

Results



Results Inputting notes & results

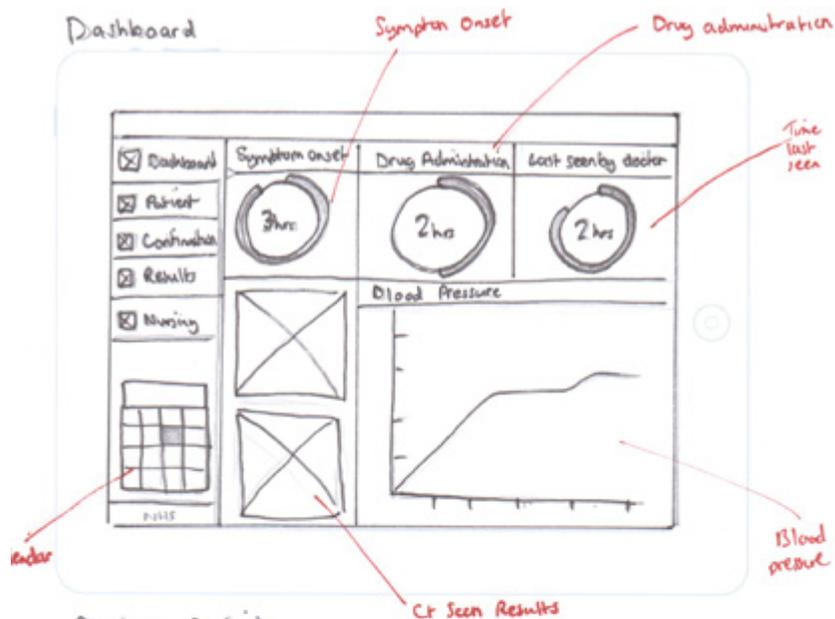


The results page will again be an important section of this app. Every patient that is admitted to the neurology ward has a number of important tests carried out on them. These reports are all currently digital, so it will not be a problem to insert them. Again it will work on the same navigation system as the patient notes, with the dates located to the left of the main area. In this wireframe I have shown what it would be like if the user has the tabbed control set to “month”. The user would be able to select a month and then a list of days would drop down for the user to select.

From my research, I have found that it is also very important for the doctors to be able to take notes regarding the results, and so each result will have a space for notes underneath, this way the user can easily input information.

In this first round of wireframes, I have not included the nursing notes, as from my conversation with a nurse, this section is exactly the same as the continuation section.

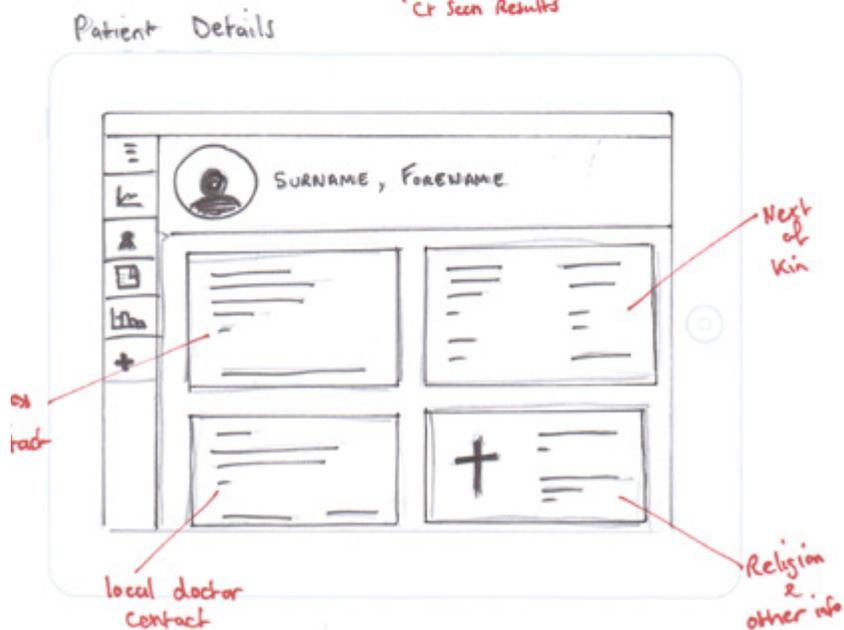
Wireframe Sketches



Here is a second draft of wireframes, I have looked at layout out the information in different ways. I may stay with the previous wireframes or combine aspects from both.

The main notation for these wireframes is the navigation on the left of the page. This is becoming more common for ios apps on tablets, especially when it is being used in landscape mode.

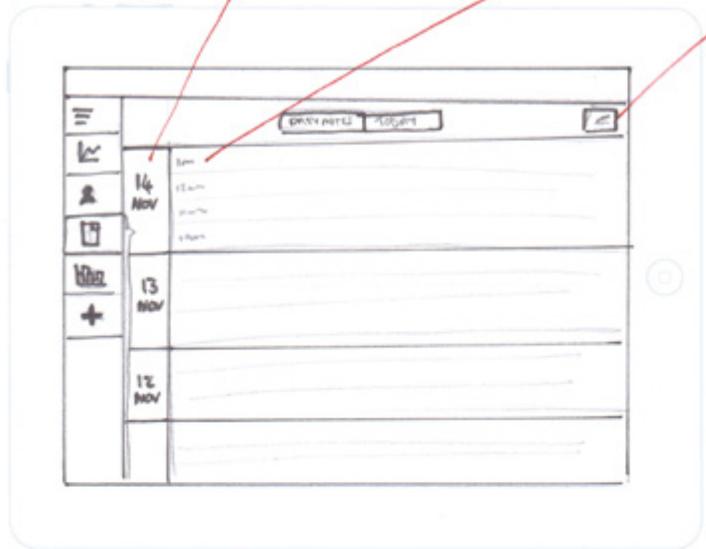
The dashboard design to the left has all of the same information as before, just laid out in a more visual manor, something that I think is beneficial to the user. Graphs and coloured charts will be perfect to get a quick overview.



The patient details screen has a number of boxes displaying relevant information. There is also the addition of the relevant religion symbol, to allow the doctor/nurse to know what religion the patient is at a glance.

Wireframe Sketches

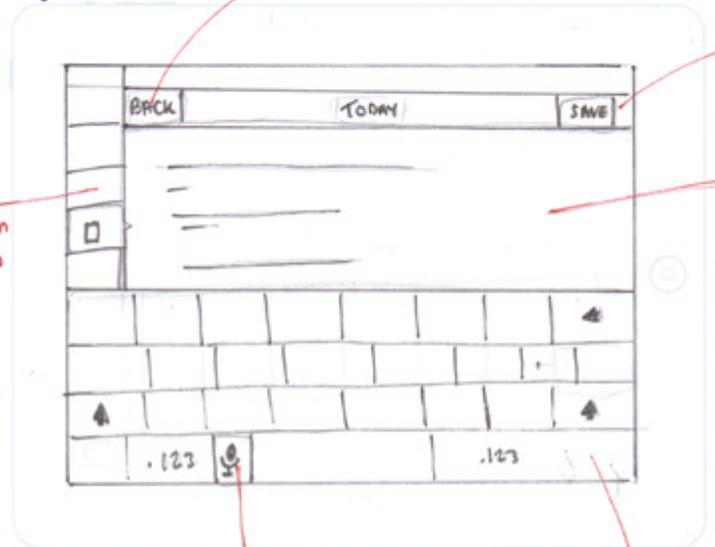
Notes section, past notes, Past notes By Date & time



The patient notes section has the notes displayed in date order down the page. The notes will have the date and also a short "snippet" of the note. This will allow the user to preview the note before looking at it in full. Again I have used the tabs at the top to allow the user to view by month or by day.

The new note button is at the top right, which is another option for placement.

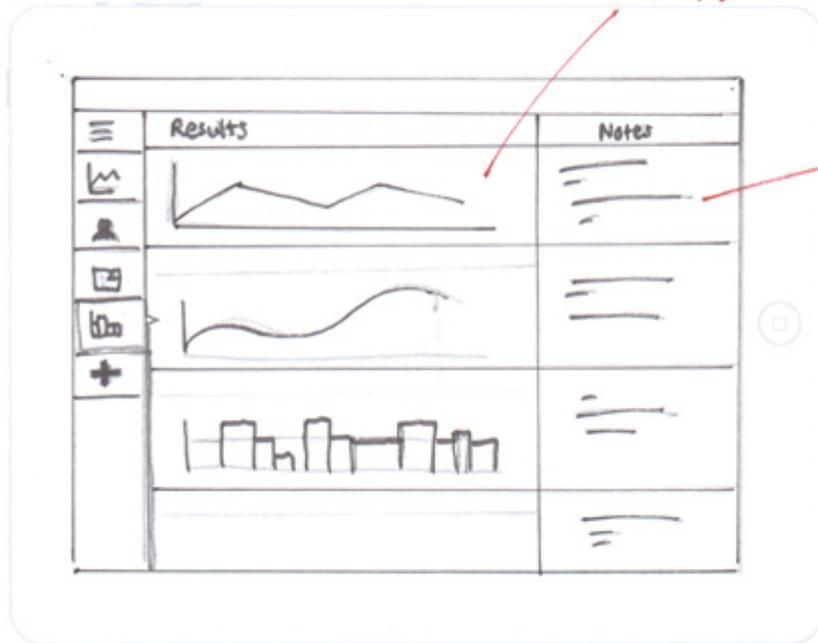
Type new note.



The screen for when the user is inputting a new note will stay relatively the same, as there is not much more than can be done here!

Wireframe Sketches

Results section



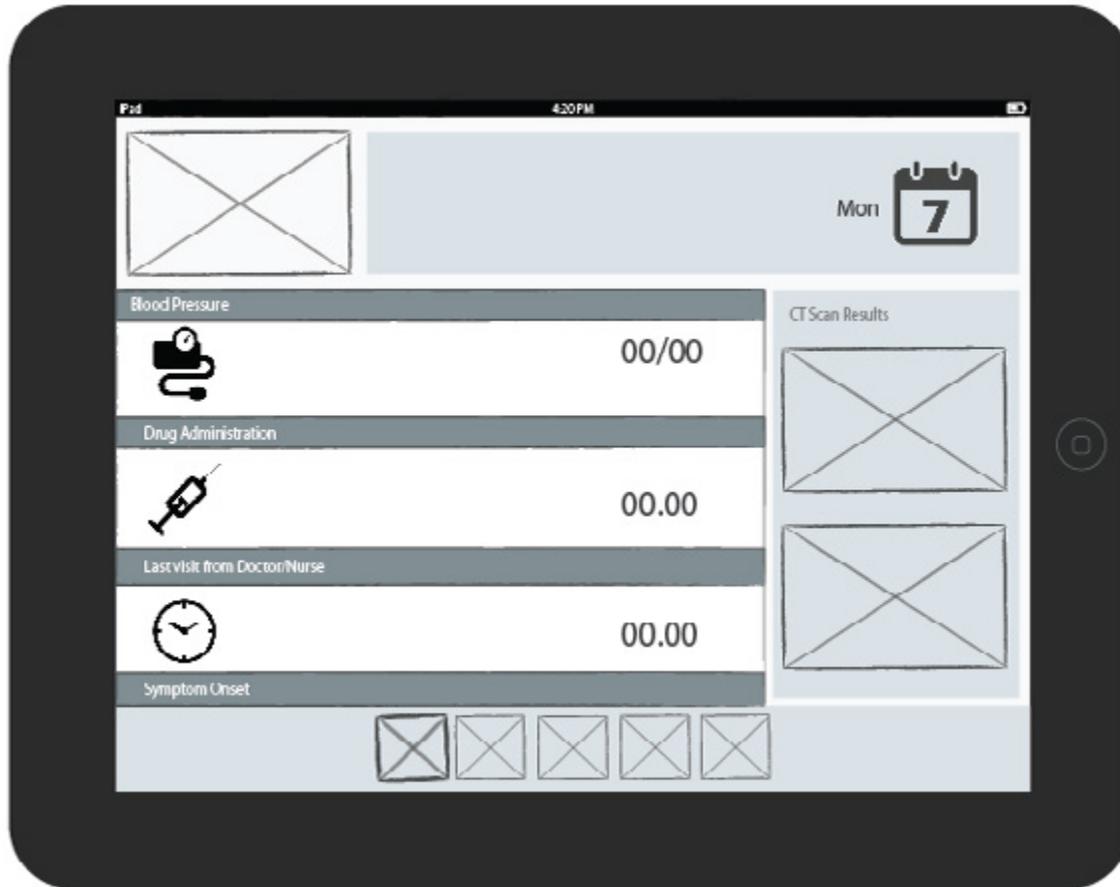
Results/graphs over time

Section for details and actions carried out due to results.

The notes section has a slightly varied layout here, I want to make sure that the results are displayed in a visual manor as much as possible. Any graphs or results will be displayed on the left, with any notes that have been taken appearing to the right of this.

If there is no notes currently in the notes section, then there will be a button to add a new note.

High Fidelity Wireframes



After reviewing my initial wireframes, I then took to Adobe InDesign to begin to create some neater wireframes of my almost final designs.

For now I have kept the NHS logo on the app but moved it to the top right and followed the first wireframe that I had designed.

However I was still not 100% happy with the look of this dashboard page and so I have taken a second look at it a few pages on.

High Fidelity Wireframes



The patient details page has mostly followed the first set of wireframes again. However I have removed the logo to allow more space for the information on this page.

I believe that this looks much better, but I may take away the box edges in the main section of this page to give the information a little more space, as this could look really boxed in.

I have also added in a back button in the top left corner of the app to allow the user to navigate back to the dashboard, as this will be the starting page and central hub of the app.

High Fidelity Wireframes



Here is a more detailed look at the continuation page. I liked the initial navigation being on the left and so I believe this is a good system to stick with. I have added in the extra option of "Year" for the tabbed search section, as a patient may be been in a previous year, this is mainly because re-admissions to stroke units are fairly common.

I have decided to locate the "new note" button in the top right of the app, but I will check through user testing that this is a good location.

High Fidelity Wireframes



The “new note” screen is relatively simple here, this wireframe gives a better visual example of how the keyboard and box will appear over the page behind, this will be slightly darker or at a lower opacity to show this.

Also the wrong keyboard has been used on this example, I will be designing for ios8, which includes the speech input button on the keyboard.

High Fidelity Wireframes



The results section will be keeping the same navigation as the Continuation. The selected days results will be displayed in the main area. This wireframe shows the option to input a new note underneath every result. The user will also be able to tap on result images to enlarge them.

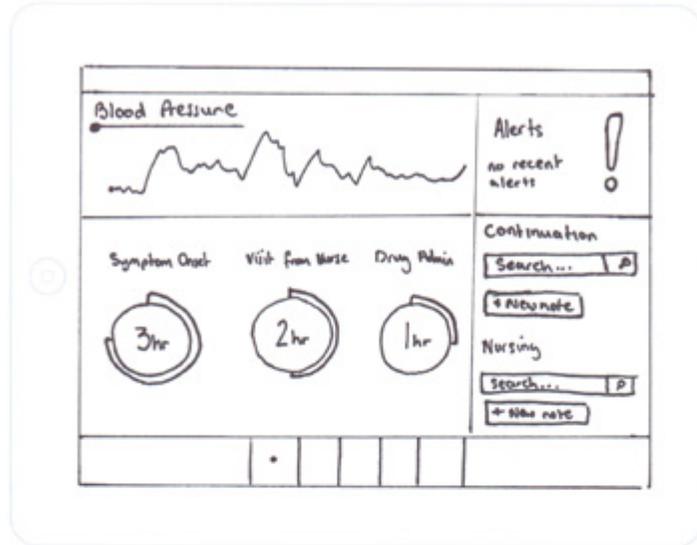
Wireframes Feedback

Before I began to start designing a mock up of the application, I first wanted to get some feedback from peers on the project and also from a potential user of the app. This is important because I am unfamiliar with how everything works in hospitals and so I can not say for sure if the designs so far will work.

The main feedback points on the wireframes so far were:

- The dashboard page definitely needs to be revisited, the layout at the moment is not working. It was advised to just completely remove the NHS logo from the page and follow a more visual look for displaying information.
- Remove the “Back” buttons from all pages, this is not necessary, as there is the main navigation for the user to see.
- People liked the initial wireframes with the navigation at the side of the page, as this was easier to see for them. This was backed up by the nurse that I spoke to, she preferred this location.
- When the user looked at the continuation mock-ups, she straight away questioned how to create a new note. She said that the top right of the page is not the first place she would look for that. Peers also stated that this was the case and the new note button could be moved to the left side of the page, next to the navigation.
- It was also mentioned that a search option should be implemented to allow the doctor or nurse to search for a term, as this would be a great help to users. This is something that is not available now with the current paper notes but would be a good addition.

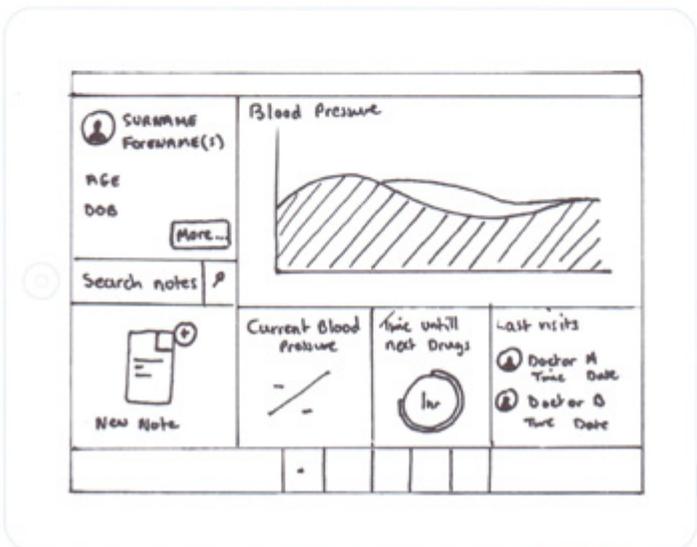
Dashboard Wireframes



Here I have revisited the dashboard page and created a few more wireframes to take into consideration. I completely agreed that the dashboard was not looking good and it needed to be changed.

I mainly wanted to incorporate shortcuts to other pages and also the most important information on this page.

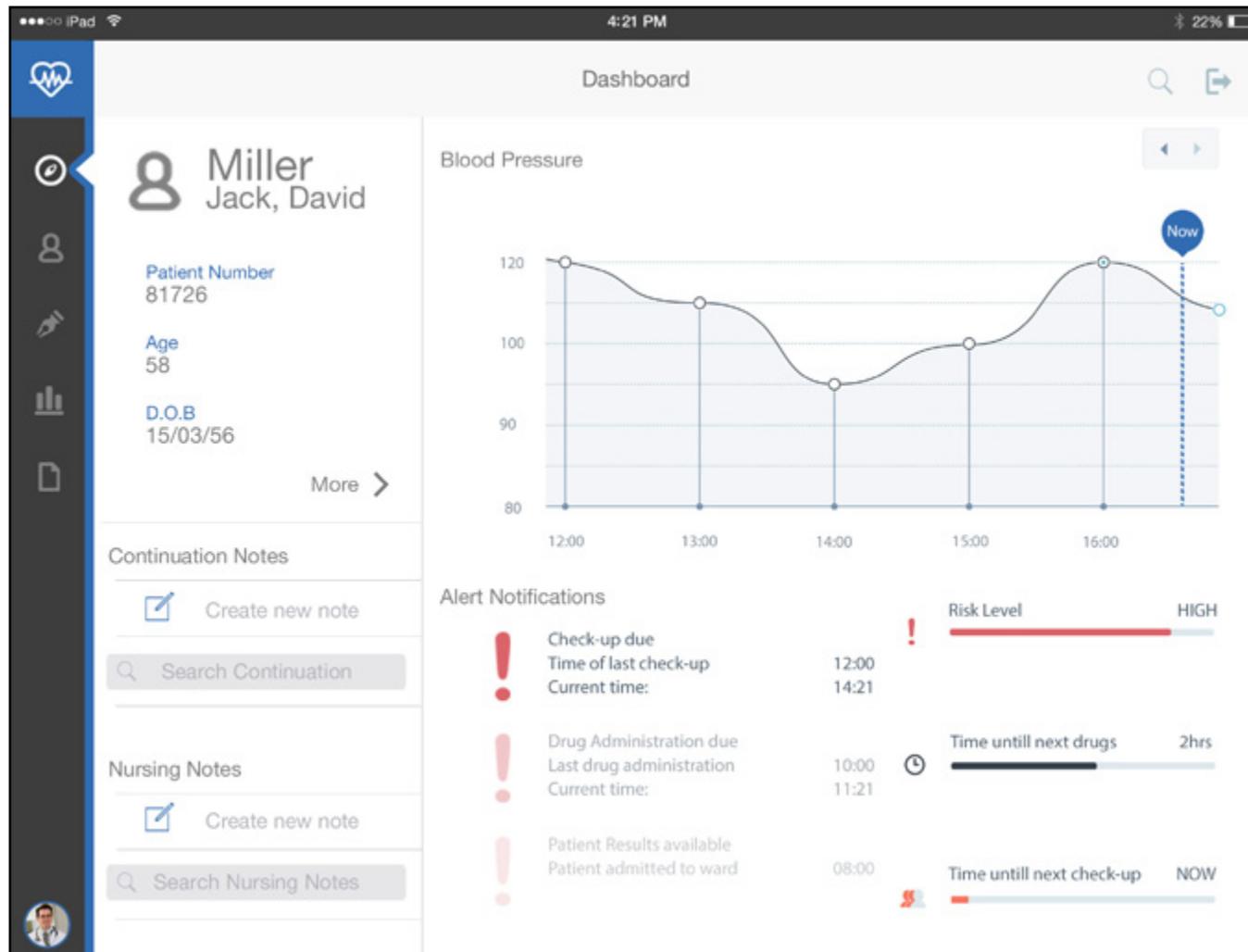
In the first design I have inserted an alert box, this will display actions that need to be taken now, so if drugs need to be administered, this will be shown.



I have also added in the options to add new continuation/nursing notes and also search these sections.

In the second version of the dashboard I have used a slightly different layout and also added in "last visits" which could show when the last visit to that patient was. This could be helpful but I don't think it is necessary, and so I will not be including this section in my final designs.

Mockup 1 - Dashboard



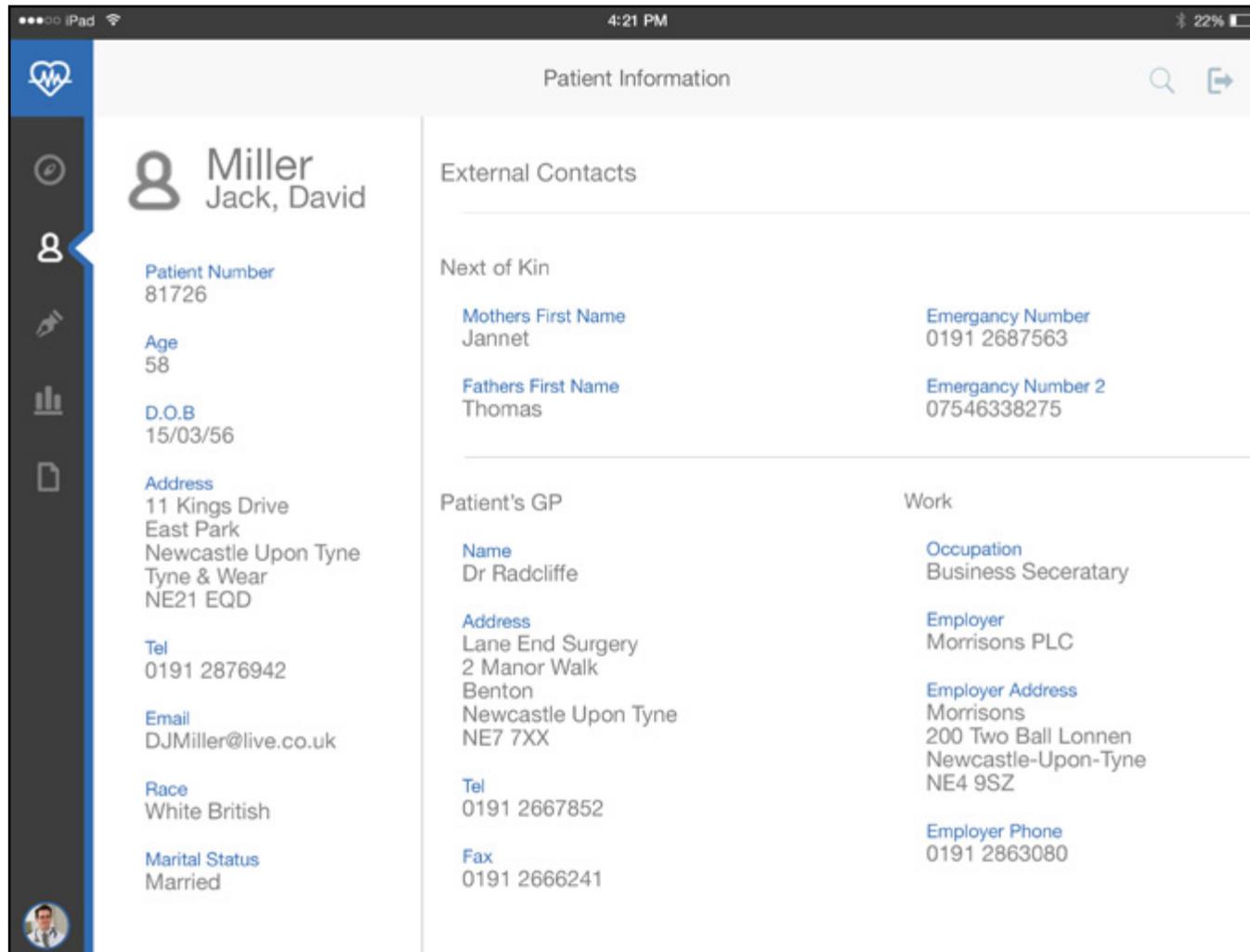
Taking into account feedback and also after looking at the newest wireframes I had created, I began to mock up the dashboard page for my app. As you can see I have tried my best to keep the app looking as clean as possible, using mainly shades of white and grey, with the NHS blue colour used to accent certain points of the design.

I have moved the navigation to the left and used symbols to represent each section of the app.

As stated before I have included shortcuts to the patient information and also to the continuation and nursing notes sections, this is to allow for quick access into the main sections of the app, which will be used the most.

I have also added in the alert notifications, this will show the latest notifications, with the past notifications showing underneath in a lower opacity. I have also added in a more visual way of displaying the patients risk level, time until they need drugs and also the time until they will next be seen.

Mockup 1 - Patient Information

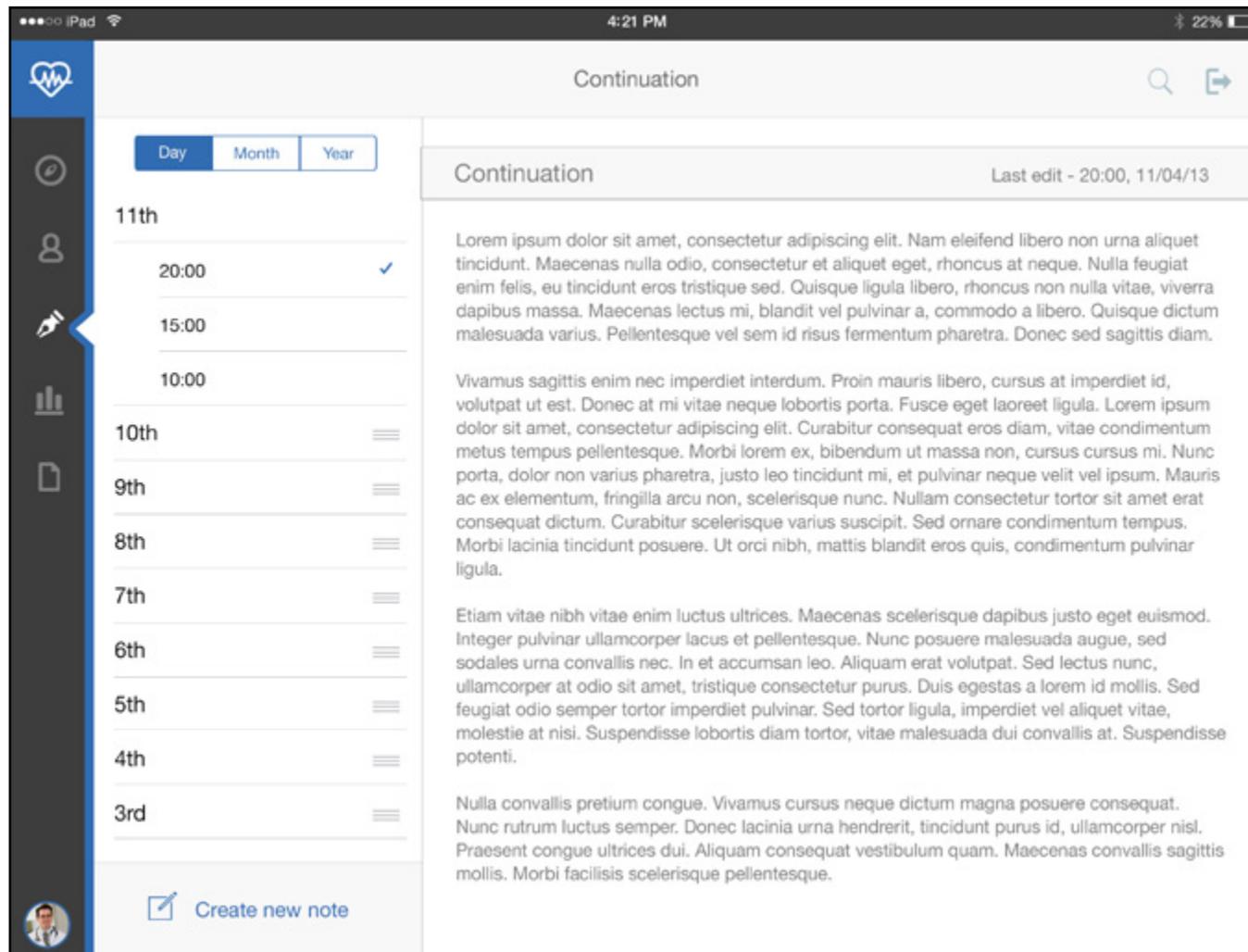


The patient information page is also very simple, but it displays all of the information that is needed. I have left a lot of white space so that the information is spread out and easily readable. Again using the blue colour for main headings.

Note at the top of the page, I also have the logo of the app in the top left corner and I have added in the option to search at the top right and also an option for the user to log out of the app.

I have also added in an avatar at the bottom of the navigation bar, this is mainly for identification purposes, if someone is logged in, it will display their photo.

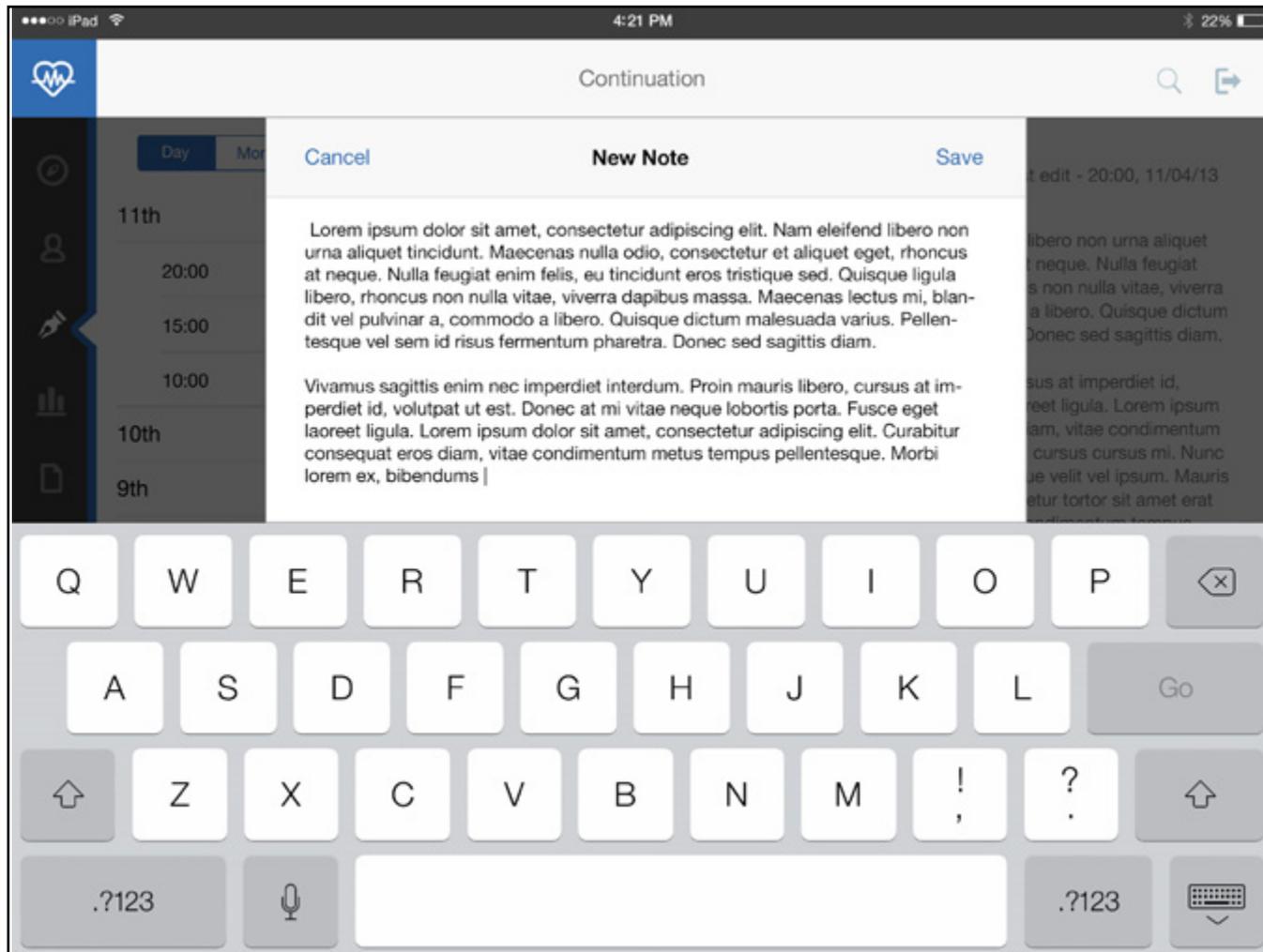
Mockup 1 - Continuation



The continuation page still works on the date selection method for navigation through the section. The user is presented with a variety of choices that they will be able to navigate through to find the relevant notes. A tick mark will show the current selection. At the bottom of this section is the create new note option. This button will not move, although the section above will be scrollable. This is to avoid confusion when using the app.

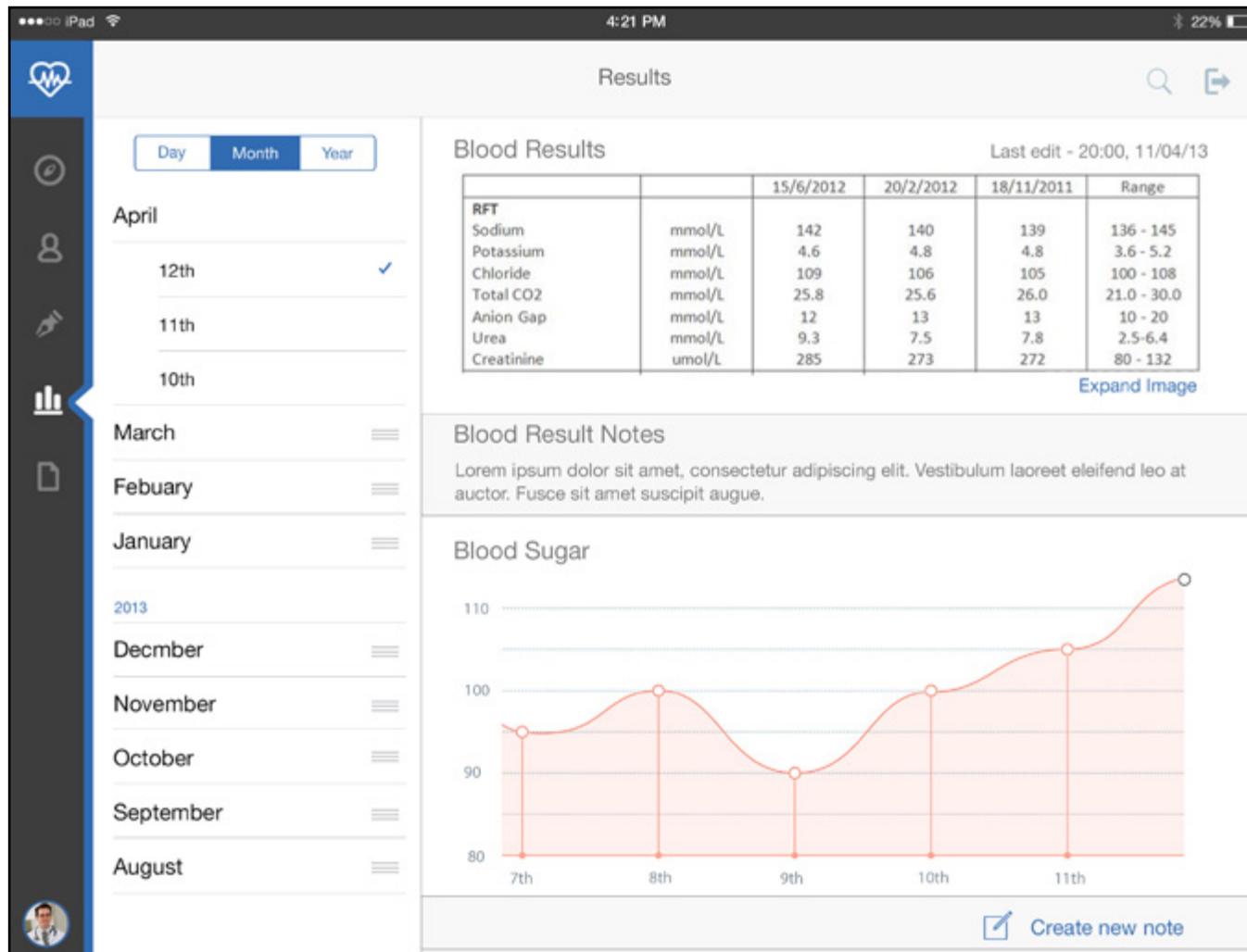
The main section contains the current day's notes, along with the time of the last edit. In this section of the app, the user will be able to zoom in and enlarge the text, this will be a great help from a usability point of view to the older doctors and nurses using the app.

Mockup 1 - Continuation, New Note



Here is the view the user will be presented with when creating a new note. As you can see, the background is darker to draw attention to the note that is currently being typed. I have left the top bar of the app visible though to allow the user to still see what section of the app they are in and also to have access to the search and log out functions.

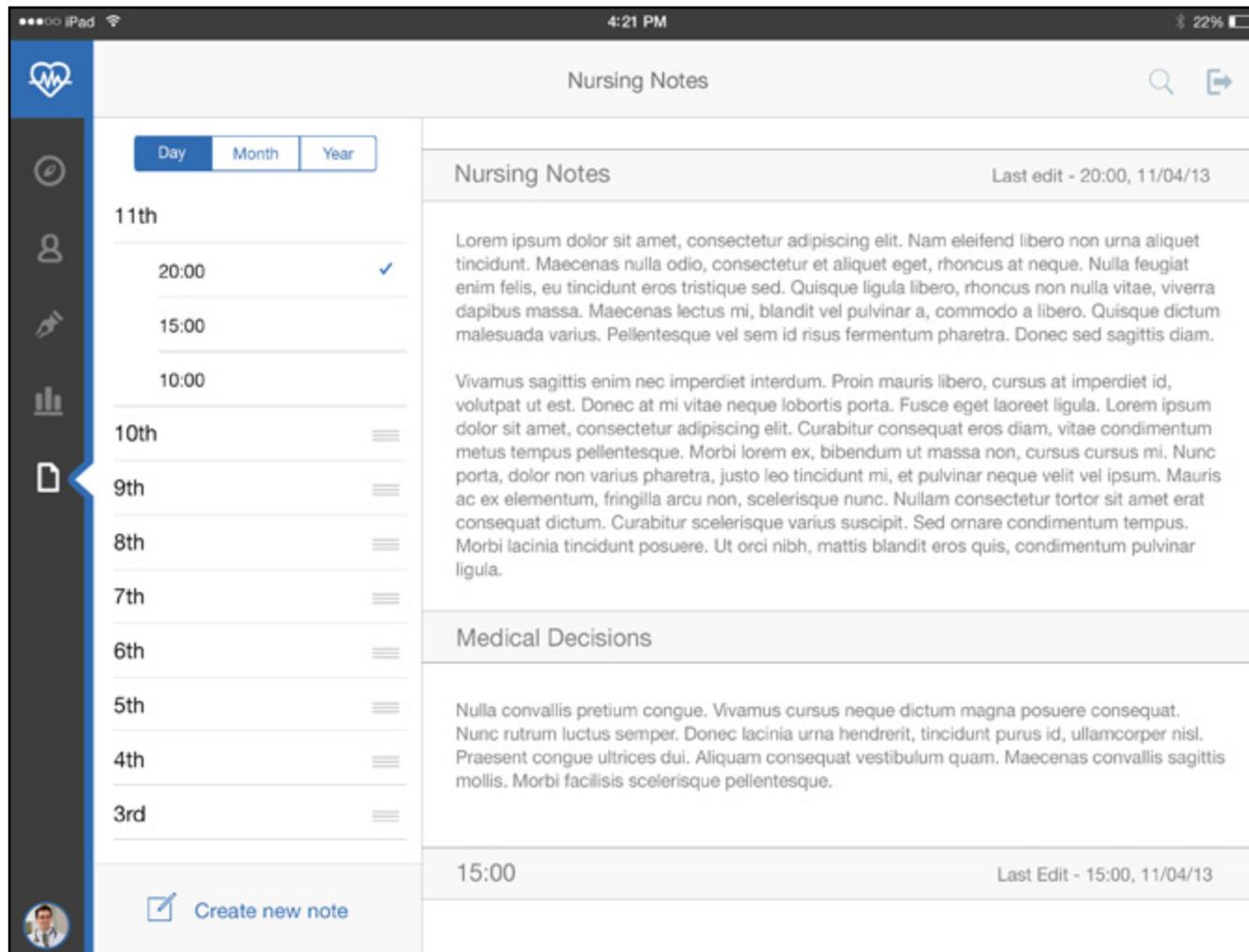
Mockup 1 - Results



Here is the results section, displaying the patients latest results, along with any notes taken. I have done some research into this and included some of the most important results in this mock up to make it as authentic as possible. I will add more in for the prototype to allow the user to scroll through and interact.

Again the navigation down the left is date-based to allow the user to locate any notes quickly.

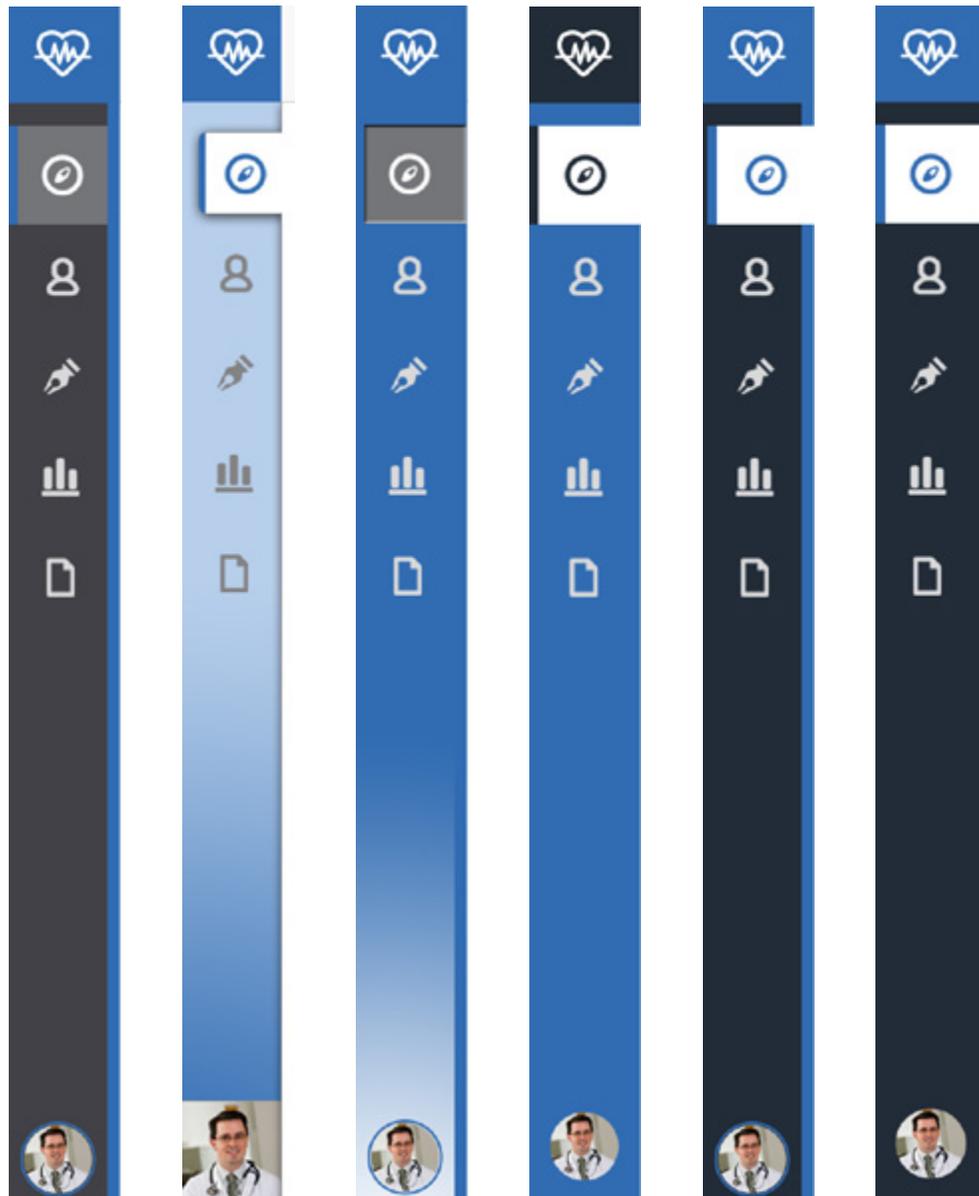
Mockup 1 - Nursing Notes



Finally, the nursing notes section. This is basically exactly the same as the continuation, but for the nurses to use.

This page will display the latest notes and allow the user to add additional notes easily.

Mockup 2



After receiving more feedback on the initial mockups of the app, it became apparent that people were unsure of the navigation on the left with a triangle as a selector. This was mainly just aesthetic and nothing concerning usability.

Because of this, I began creating a few different designs for the look of the navigation bar. To the left is the outcome of that activity. I have tried a few various styles using different colours and styles of selector.

This turned out to be a much more difficult job than I first anticipated and at the end I had a few favorites that I wanted to get feedback on to make a final decision.

The final selections were the 3rd from right, and the furthest right. These were very simple and flat, and I also liked the selector being white, so it flowed into the main content area of the app.

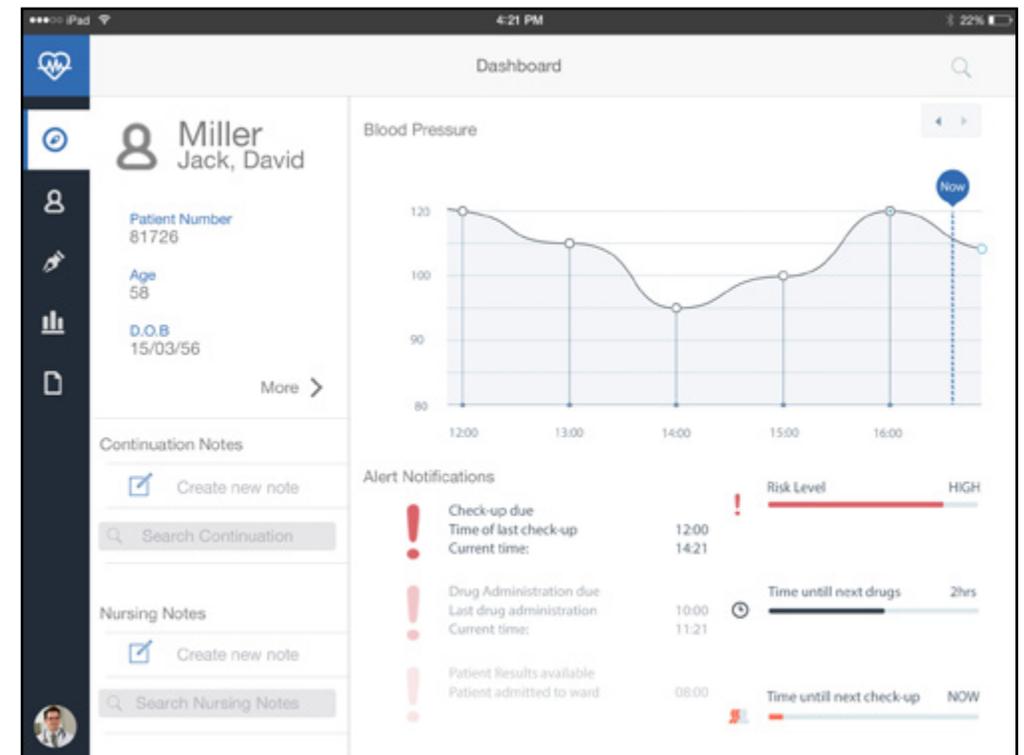
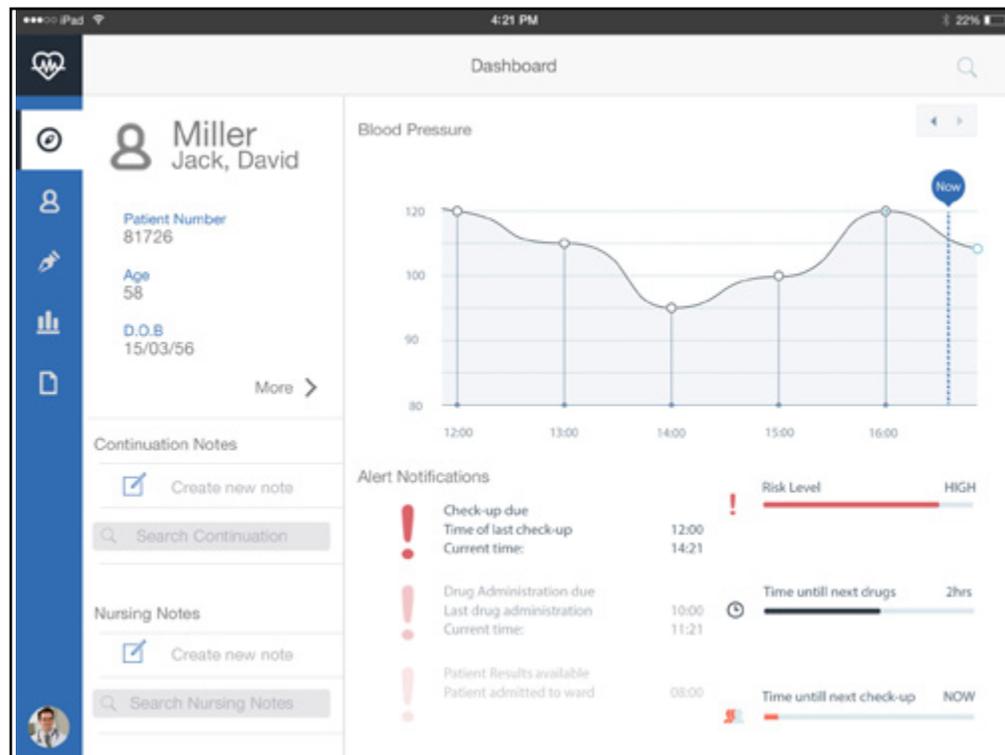
Mockup 2

I then mocked up the two navigations onto one of the pages to get an idea of how they look. I think both work well and both are suited to the style of the app.

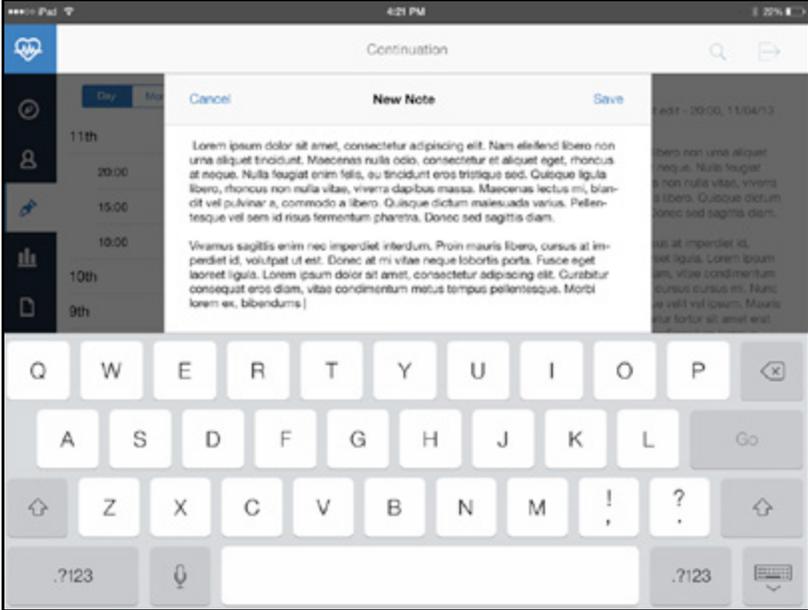
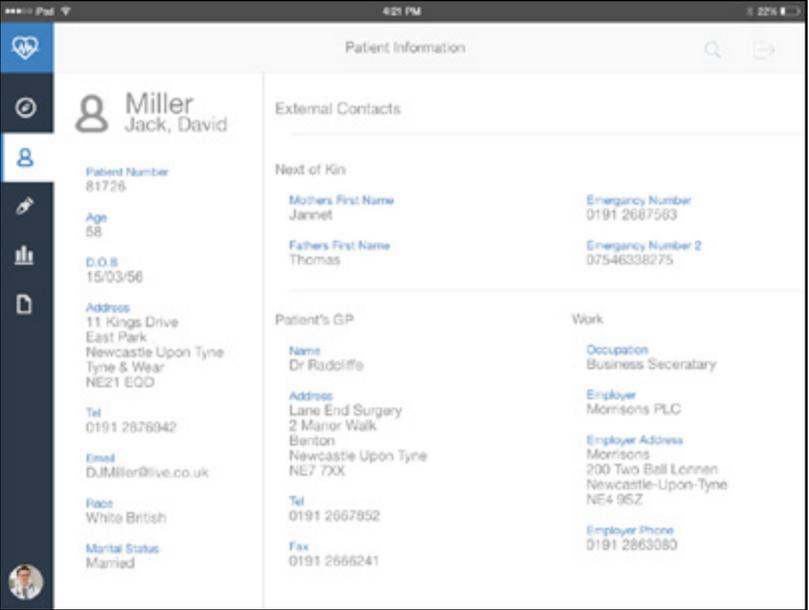
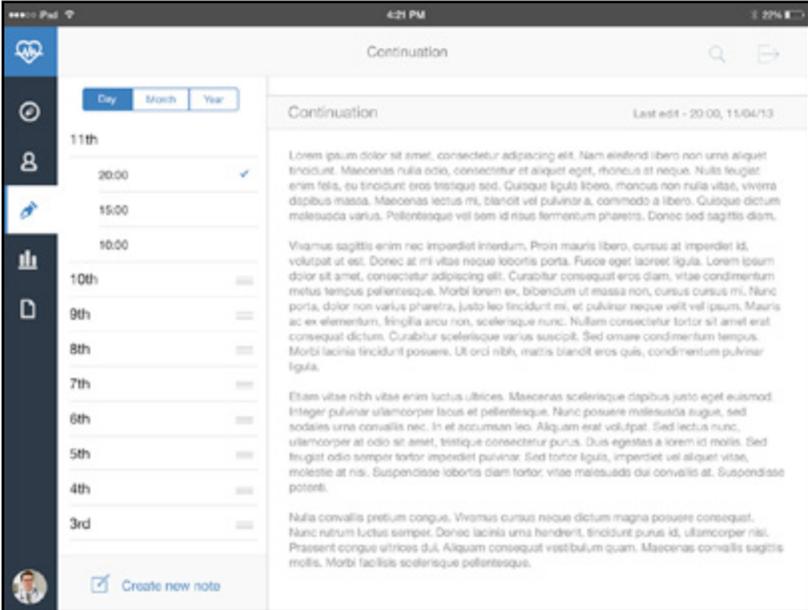
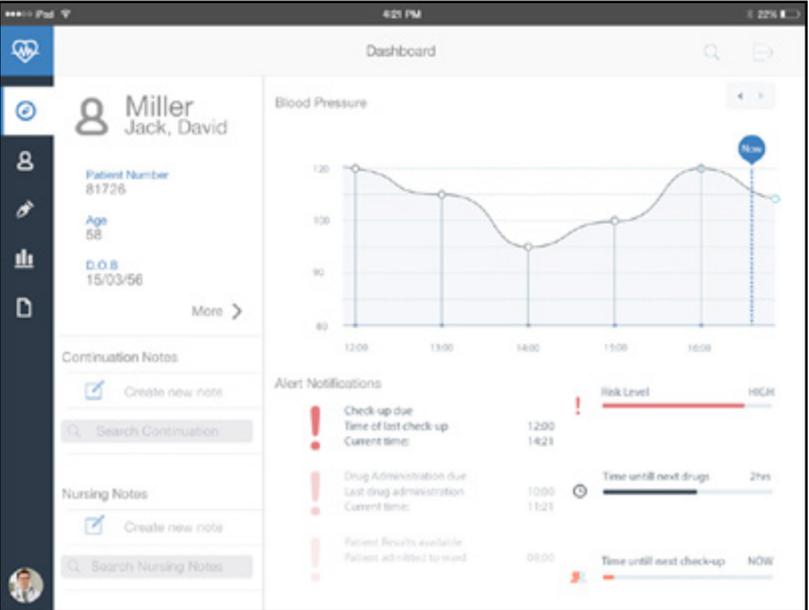
These designs are basically just reversed versions of each other, using the same colours, which work well in my opinion!

After a lot of deliberation and questioning peers, I decided to go ahead with the version below. This was because the blue seemed to draw the users attention away from the actual content too much, whereas the darker grey blended in more and was much more suited to the overall look of the app.

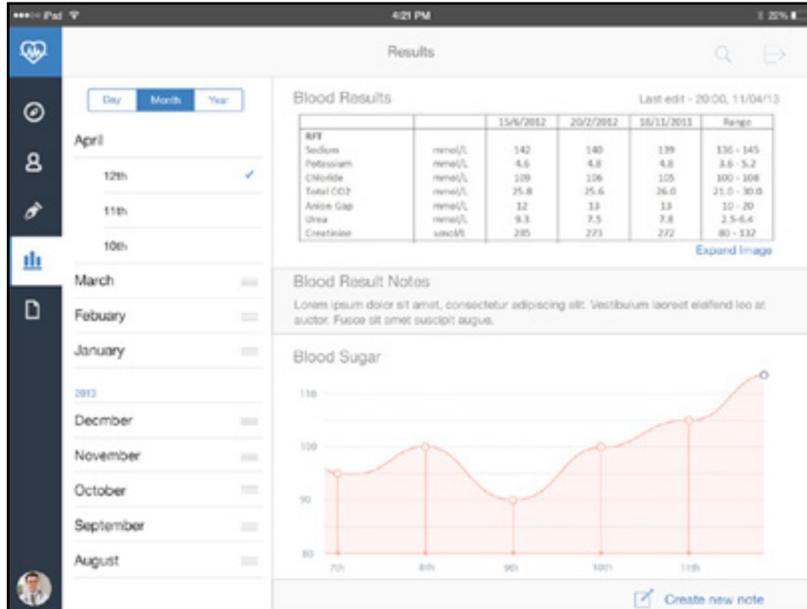
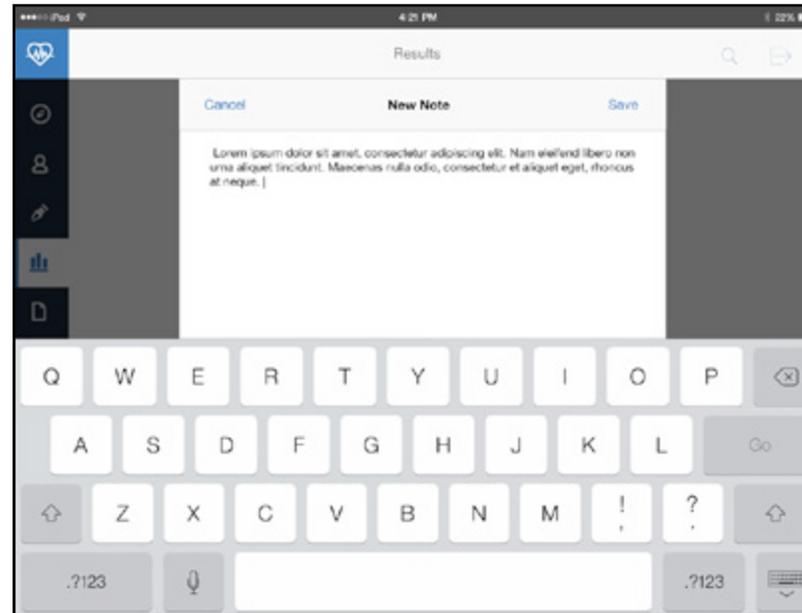
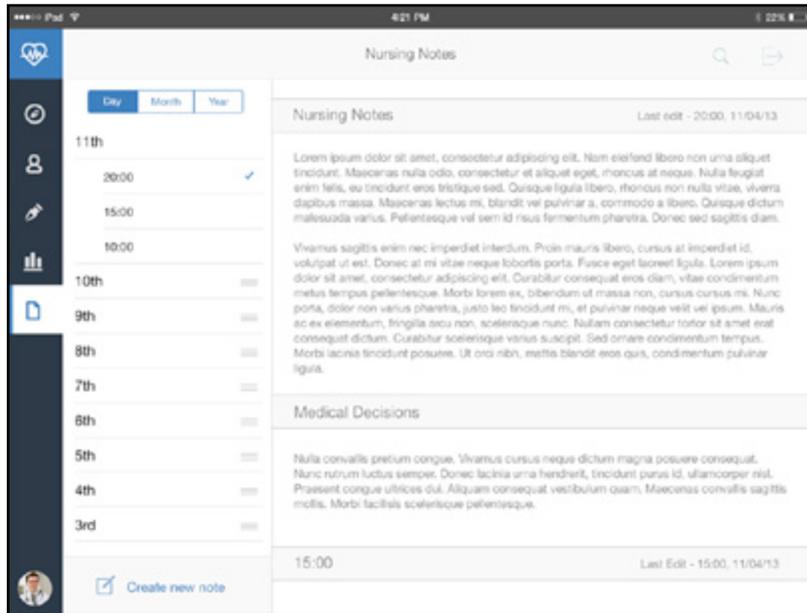
I then started to add these navigations into the rest of the pages.



Mockup 2

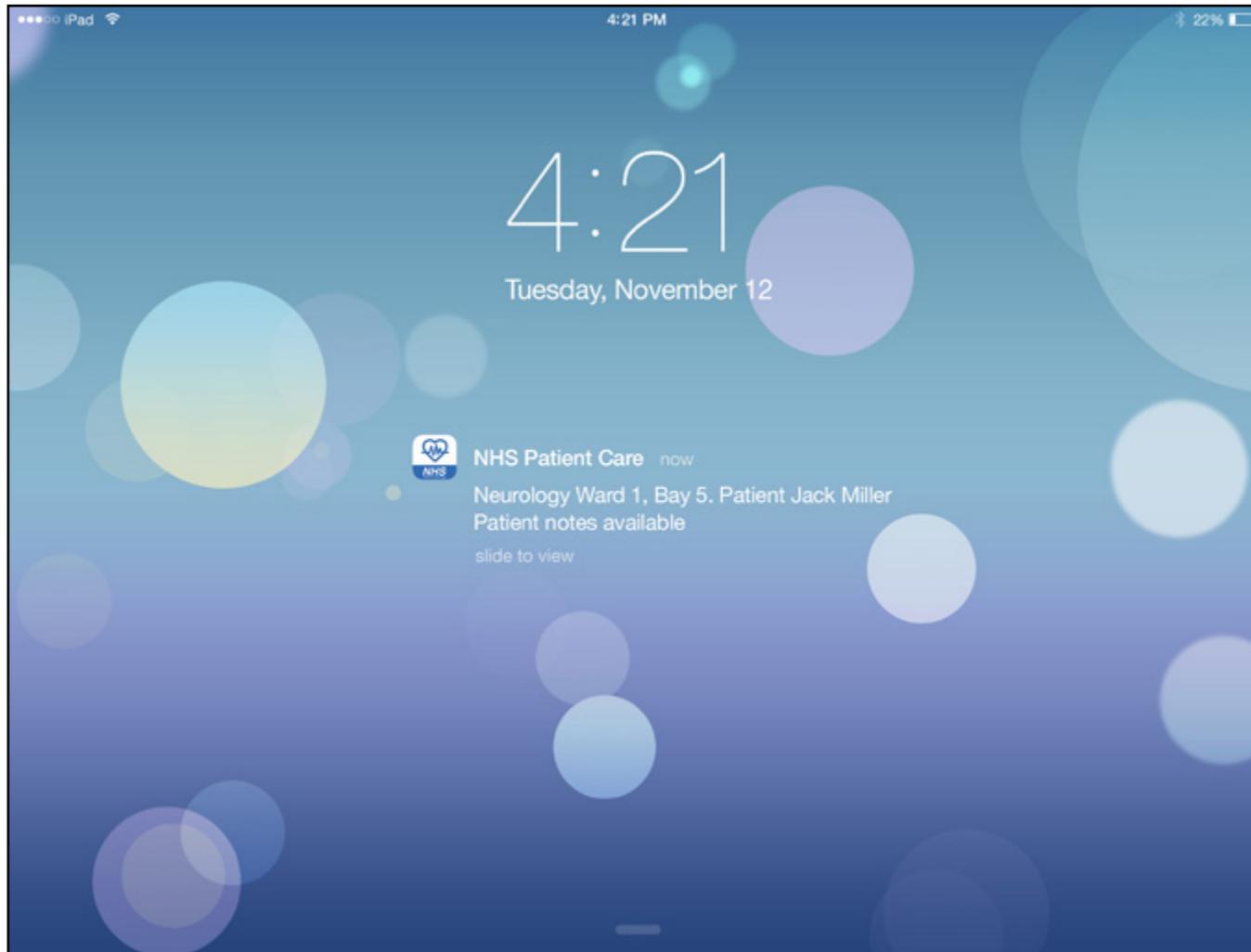


Mockup 2



As you can see from the designs over the previous pages, I have made little changes to the interface, mostly just to the navigation design. In my opinion this is only a small change, but it looks a lot better, it is a much cleaner navigation that is still in keeping with ios guidelines and it works well.

Mockup 2



When going through the second iteration of my app, I have also mocked up the notification that will be displayed when the user walks within range of a patient's iBeacon.

The notification will display the app name, the ward, bay and patient name for the user to see. Once they have double checked that this is all correct then they can advance by swiping right, this will open the patient file.

It was now time to begin some more thorough user testing. I mocked up the app on Proto.io and made as many functions as possible work to allow them to use the app. The following pages show the outcomes of this activity.

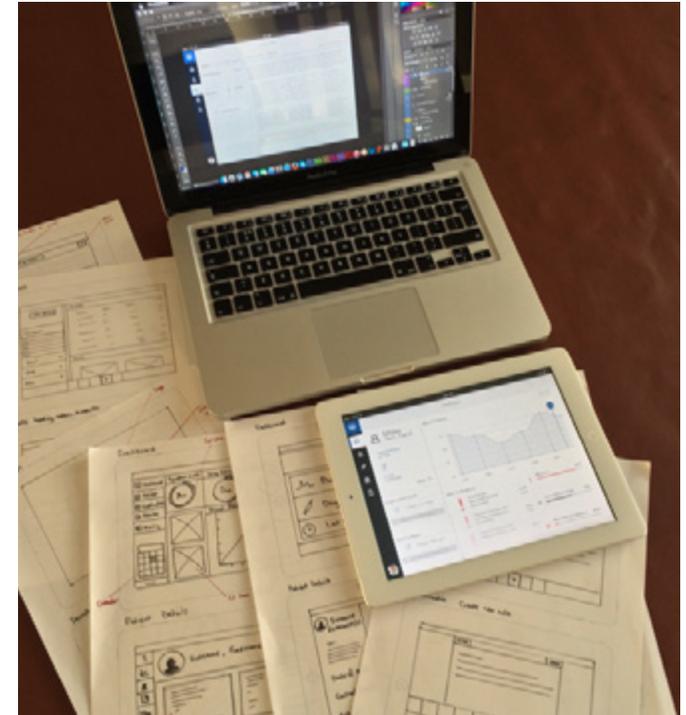
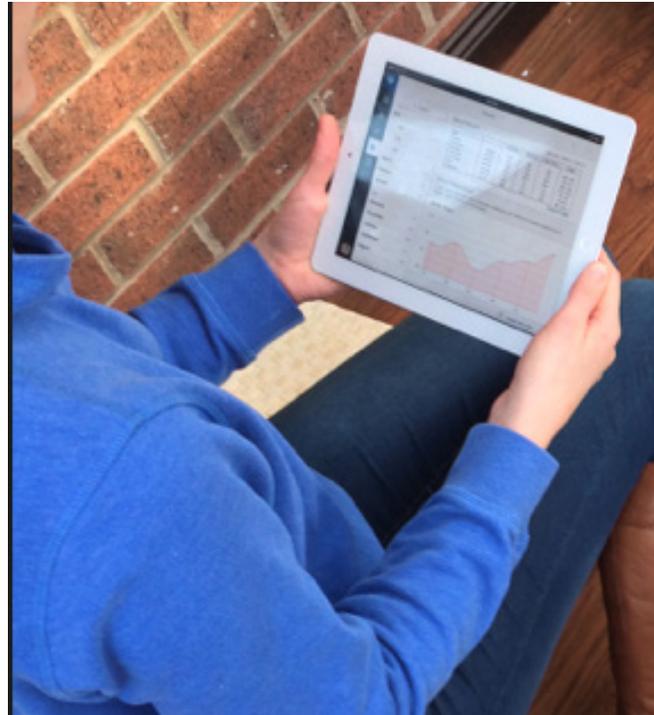
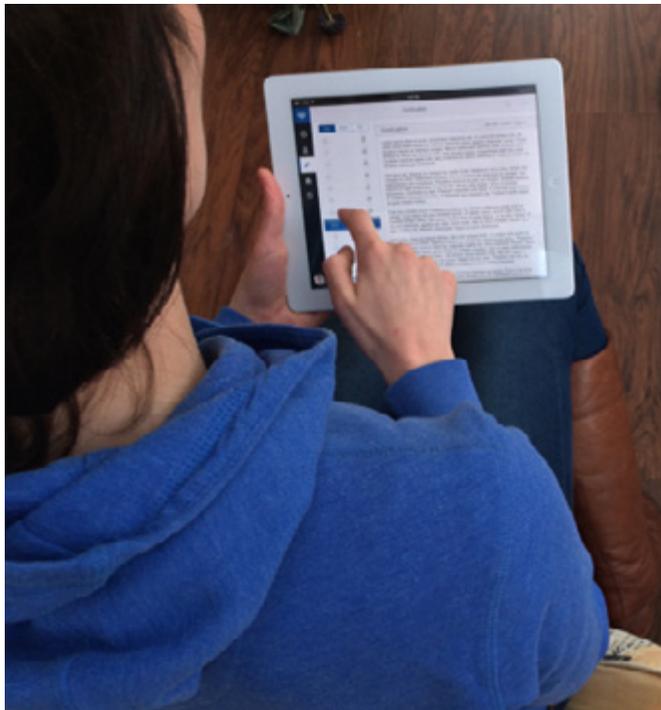
User Testing

I wanted to do as much user testing as possible to ensure that the application was as realistic as possible. Luckily I was able to meet with an NHS nurse who works on the stroke wards. This was perfect, as she would be a potential user of this app.

For the user testing, I had set out a list of 'tasks' for her to complete, this was to test how easy it was for someone completely new to this app to navigate and find important aspects.

We also had a lengthy conversation to discuss the app in its current form and what can be done to improve the app. We had already met and spoken a few weeks previously about the content of the app, however this was the first time she was able to use an almost fully functional mockup.

The results from this activity were very interesting and proved really helpful towards the end product, on the following pages are the results of the user testing session.



User Testing

During user testing, there were a few main points that were brought up and discussed.

- From my observations and later a conversation, it was determined that the main navigation was fairly difficult to use. The user did not know what icons related to what section, which made her result to clicking each one to determine what section it was. This is acceptable for a first time user but we both agreed that it would be beneficial to make this more obvious.

- Also the navigation to look through the notes was not working. This was a huge point that I had not realised previously. As it stood, I had the option to view the notes by Days, Months or Years. This is ok, apart from the fact that if you select month, once the user taps months, all of the days drop down, and if the user searches by years, then the months drop down, followed by the days. This is very confusing and leads to the navigation being clogged up unnecessarily, so this will need to be re-thought.

- The search bar is wasted in the top right corner of the app, this should be removed and incorporated into the navigation to search for a note.

I also discovered a few things that had not been mentioned in our previous meetings, again these were really helpful!

- Firstly, it was pointed out that the “Patient number” is actually called an MRN number (Medical Records Number) so this will have to be changed.

- It was also mentioned that not only doctors and nurses write in the notes, there is also therapists in the stroke ward, these include physio and speech specialists to aid with recovery of a patient. This will have to be added into the app. It became apparent that everyone just continued on from the last notes with the current system, they just insert their paper and start writing. Also I discovered that the doctors, nurses and therapists all write on different coloured paper to help distinguish their notes from the others;

- Doctors write on plain paper
- Nurses on light blue
- Therapists on green

The paper is only slightly tinted but it allows the user to quickly distinguish the sections. This will be something I will have to incorporate into my final designs.

Other small points were;

- The pages are lacking a little in colour, maybe something could be done to improve the look and make it a little more interesting.
- There should be a log in screen for the app to show how the user would log in.
- Also maybe a screen could be added to show that the app is waiting for a patient to be within range, this could be a waiting screen. The user can then just lock the iPad and wait for a notification once they have logged in.
- Remove the buttons from above the graph on the Dashboard page. These could accidentally trigger the user to log out and they are not needed anyway, as the user would be able to scroll through the graph to see past results.
- The “create new note” text on the dashboard page is too light.

User Testing

As mentioned on the previous page, I had to look at the main navigation. The nurse who helped with the user testing mentioned that she thought the notes icon at the bottom was the continuation.

Because of this, I decided it would be helpful to take this icon and change it slightly to help show the different sections. I solved this by adding an 'M' for the Medical Continuation, an 'N' for the Nursing section and a 'T' for the Therapist section. This along with the colours makes it clear to the user what section is what.

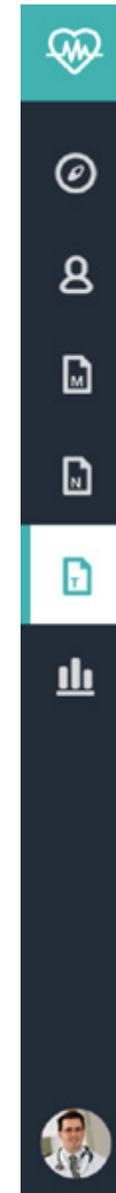
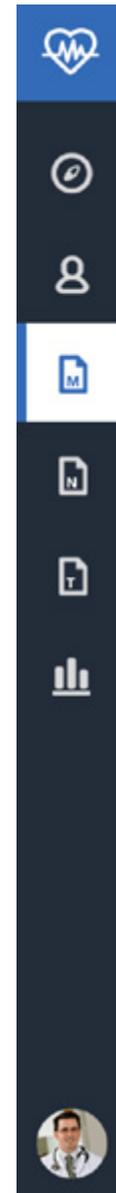
Also the colour of the selector, the icon and also the colour at the top of the page changes depending on the section the user is in.

I checked and tested this again and discussed if this was clear and it was agreed that it was a great improvement on the previous designs.

Previous Design



Improved Designs



User Testing

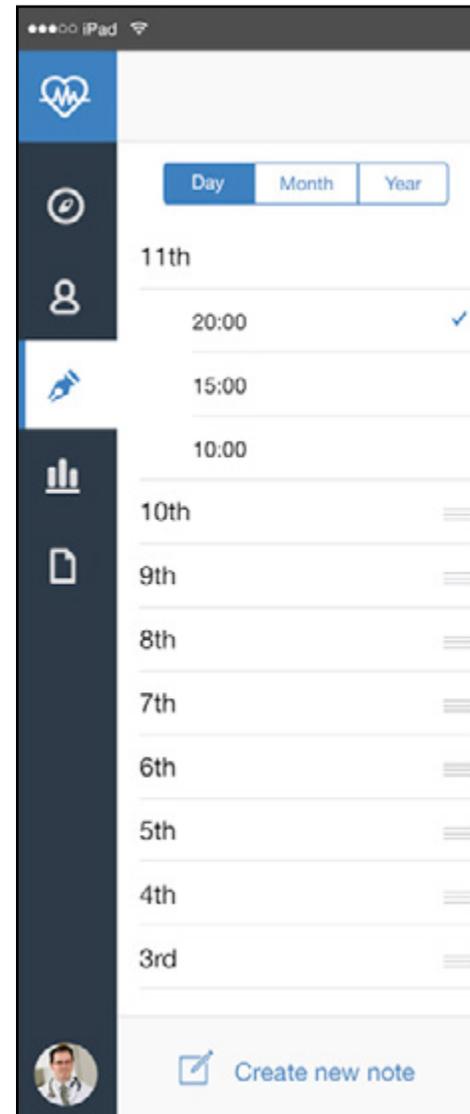
For the other navigation problem I wanted to first understand why a doctor or nurse would want to look at previous patient notes. The main reason was to look for symptoms they have had in the past and what was done to correct and cure these problems. Also they would search for a date so this is still something that would have to be incorporated into the navigation system.

My solution is much more simple, yet works more effectively, whilst looking much cleaner and neater. I have removed the confusing lists and replaced this with a date picker, this way the user can easily chose the day, month and year they want to look at and it will bring up the results to the right.

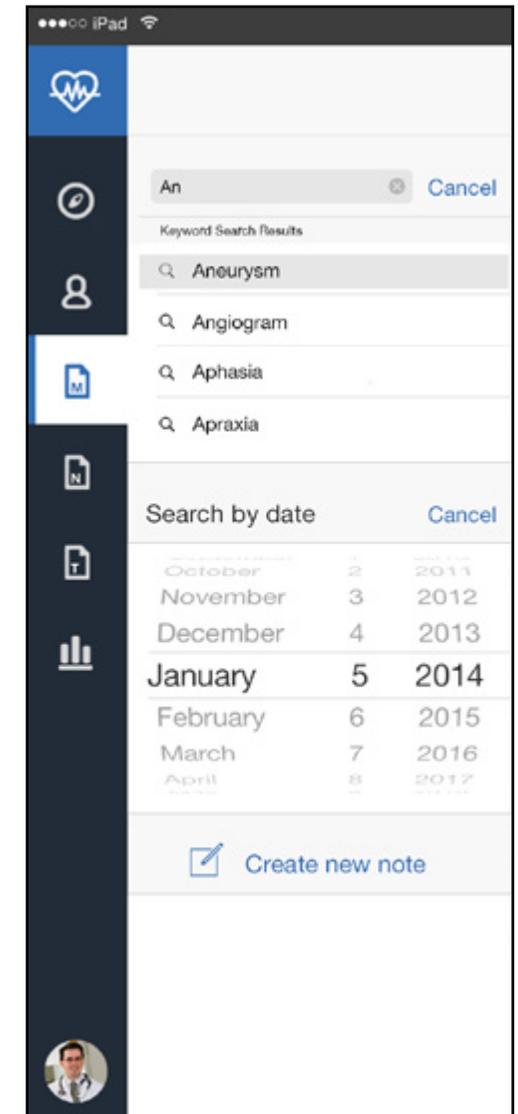
I have also moved the search bar down into this area for a keyword search. The user will be able to type a keyword in here, and it would bring up any past notes that include this word, along with a snippet of the note for the user to quickly read.

These two changed are small differences but will make a huge difference according to the nurse I was speaking to. I will incorporate this into the other sections of the app.

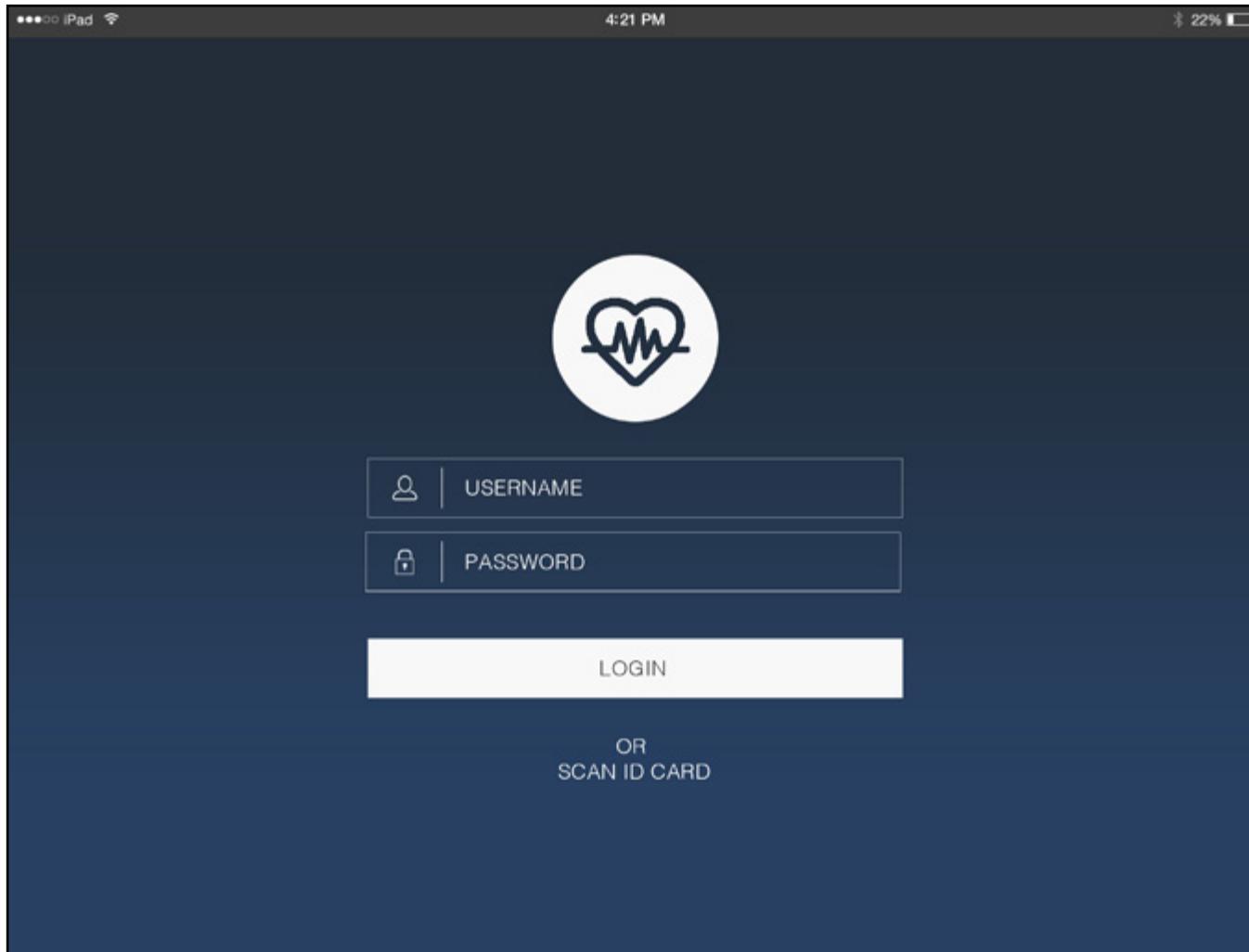
Previous Design



Improved Design



Final Mockup - Login

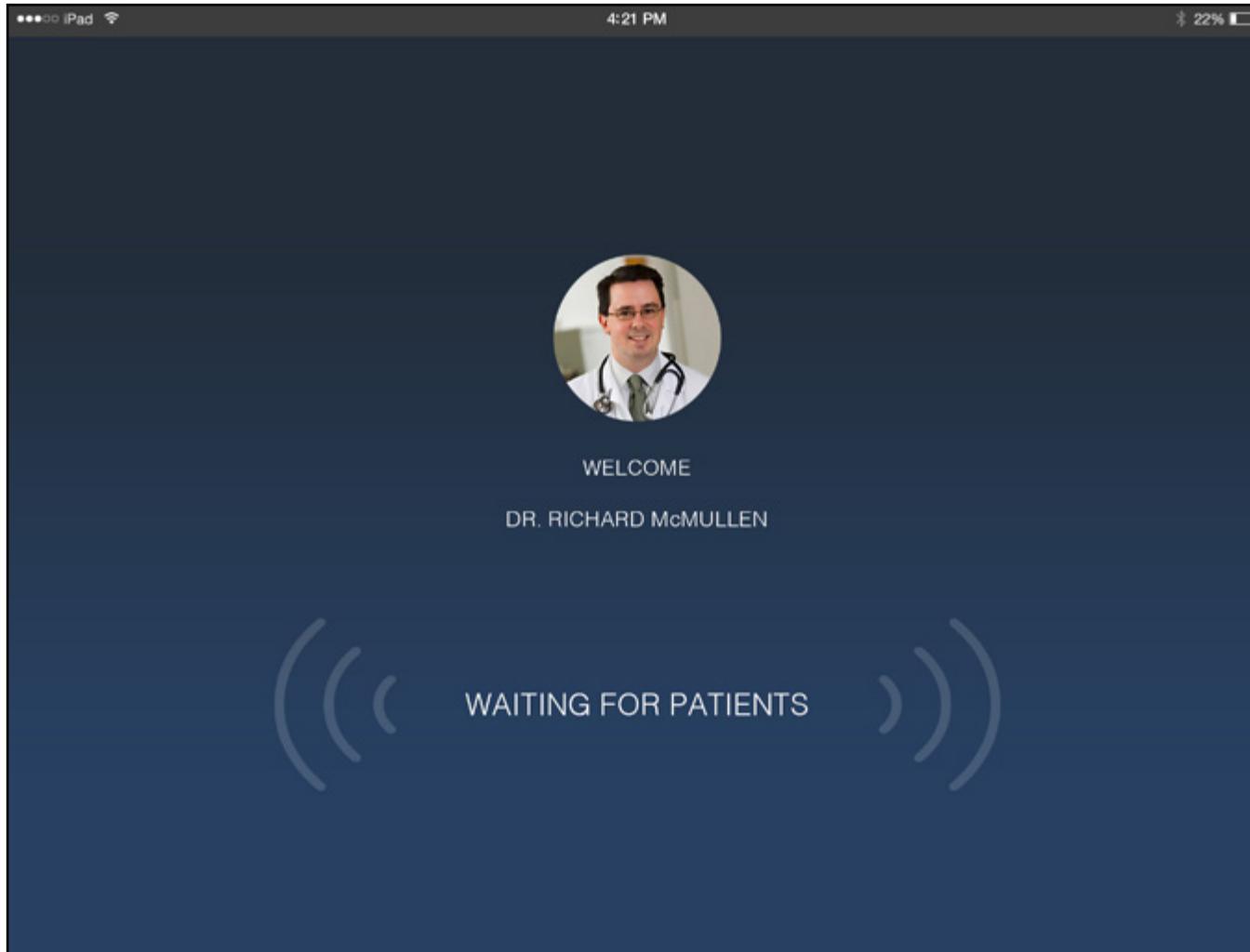


Login

Due to the user testing, I have created a login screen for the app. I have stuck to the same colours to tie everything in together and kept it all flat and simple.

Furthermore, I discussed the idea of scanning the user's ID card to login and this would be a possibility, so if the user does not want to input their username and password, they would be able to scan the NHS ID card that they have and this would log them into the application.

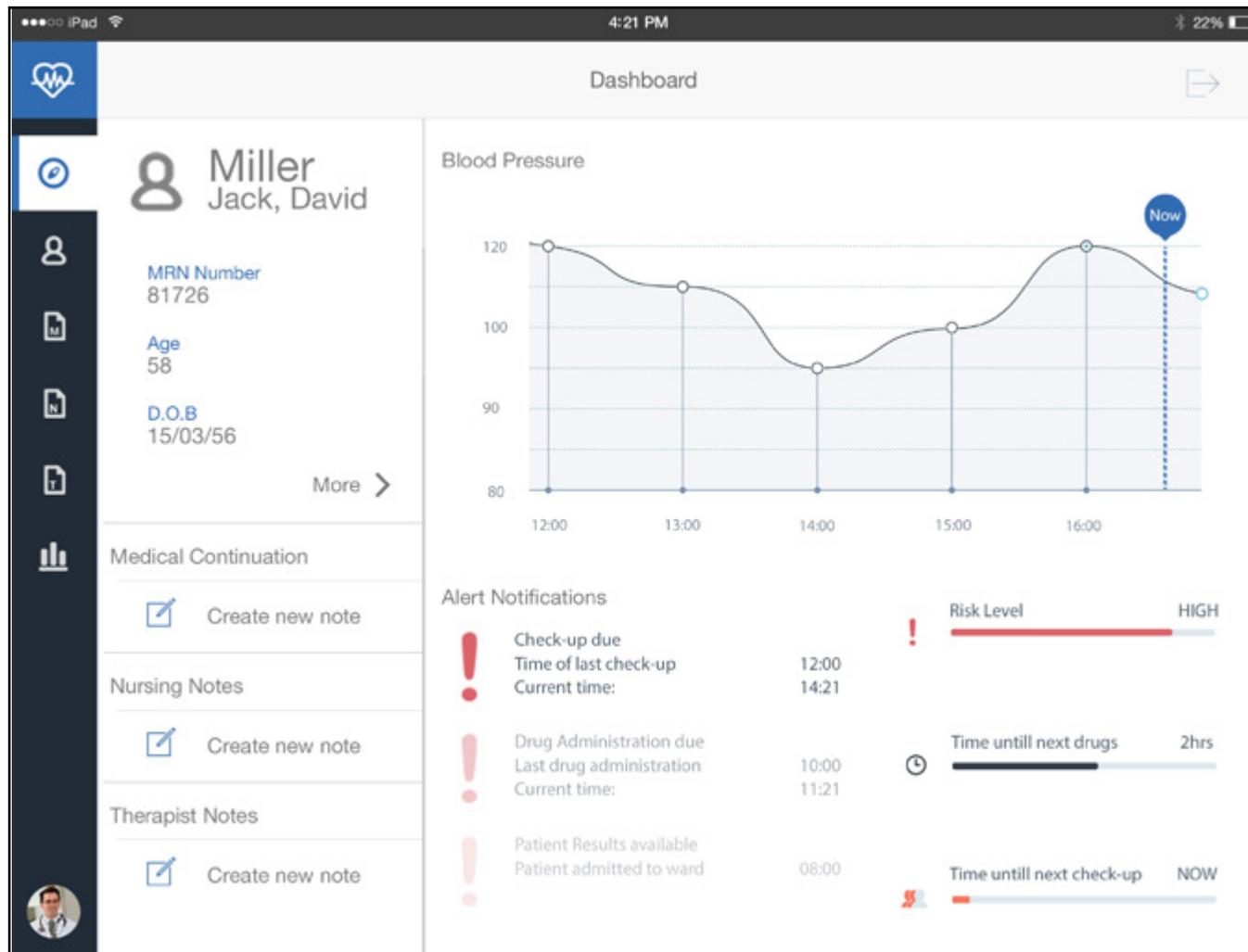
Final Mockup - Waiting Screen



Welcome Screen

I have also created this welcome screen, this will show the users image when they log in and also display a message notifying the user that the app is active and waiting for a patient. The small signal icons will animate and show visually that the app is “listening”.

Final Mockup - Dashboard



Dashboard

The final and improved Dashboard looks much improved. The "create new note" text is much clearer not and also the buttons have been removed from above the graph, which frees up some space.

Final Mockup - Patient Information

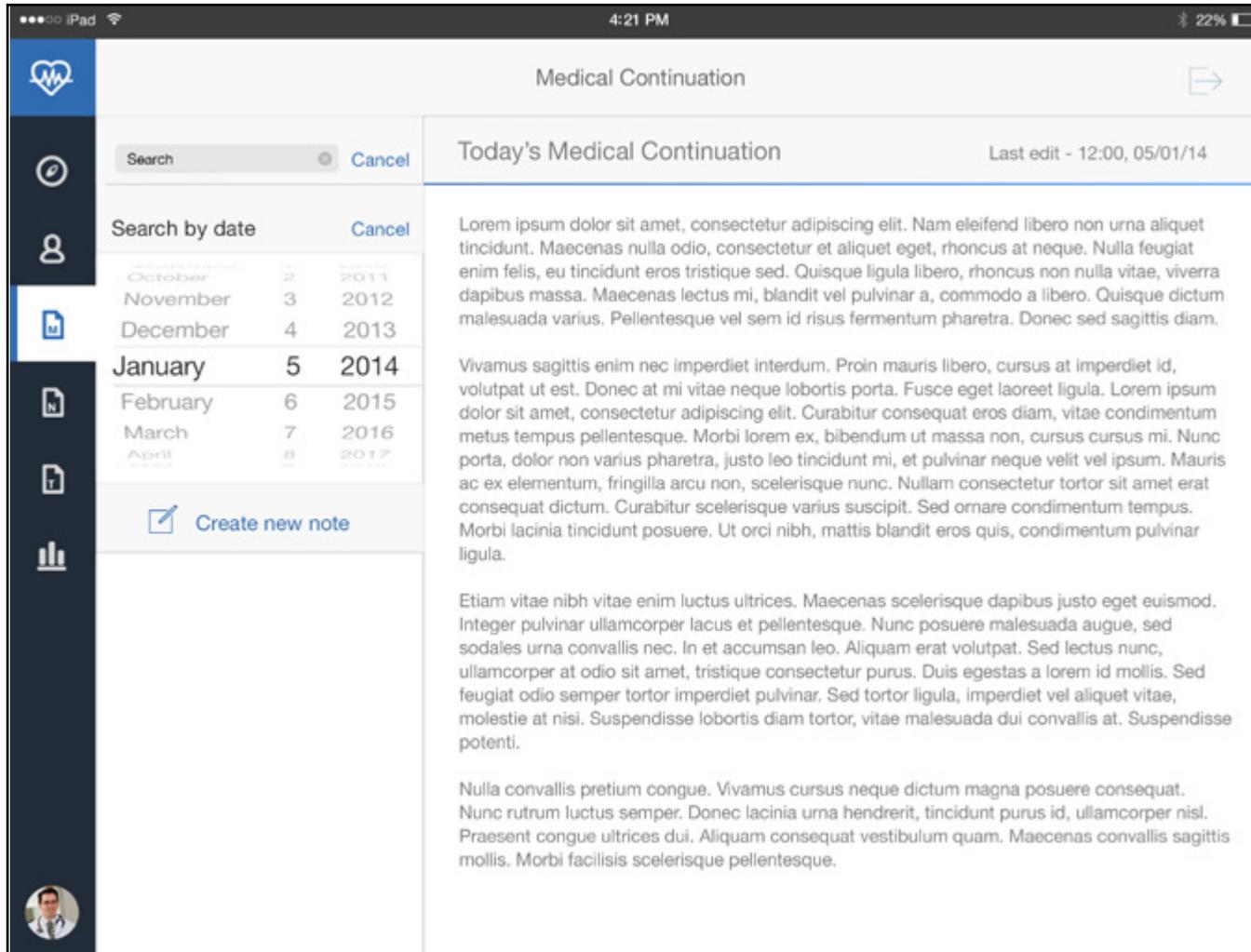
The screenshot shows a mobile application interface for patient information. At the top, the status bar indicates 'iPad', signal strength, Wi-Fi, time '4:21 PM', and battery level '22%'. The app header is 'Patient Information' with a heart icon on the left and a share icon on the right. A vertical sidebar on the left contains icons for home, search, profile, and other functions. The main content area is divided into two columns. The left column displays patient details for 'Miller Jack, David', including MRN Number (81726), Age (58), D.O.B (15/03/56), Address (11 Kings Drive, East Park, Newcastle Upon Tyne, Tyne & Wear, NE21 EQD), Tel (0191 2876942), Email (DJMiller@live.co.uk), Race (White British), and Marital Status (Married). The right column is divided into 'External Contacts' (Next of Kin: Mothers First Name Jannet, Emergency Number 0191 2687563; Fathers First Name Thomas, Emergency Number 2 07546338275), 'Patient's GP' (Name: Dr Radcliffe, Address: Lane End Surgery, 2 Manor Walk, Benton, Newcastle Upon Tyne, NE7 7XX, Tel: 0191 2667852, Fax: 0191 2666241), and 'Work' (Occupation: Business Seceretary, Employer: Morrisons PLC, Employer Address: 200 Two Ball Lonnen, Newcastle-Upon-Tyne, NE4 9SZ, Employer Phone: 0191 2863080).

Patient Information	
Miller Jack, David	
MRN Number: 81726	
Age: 58	
D.O.B: 15/03/56	
Address: 11 Kings Drive, East Park, Newcastle Upon Tyne, Tyne & Wear, NE21 EQD	
Tel: 0191 2876942	
Email: DJMiller@live.co.uk	
Race: White British	
Marital Status: Married	
External Contacts	
Next of Kin	
Mothers First Name: Jannet	Emergency Number: 0191 2687563
Fathers First Name: Thomas	Emergency Number 2: 07546338275
Patient's GP	
Name: Dr Radcliffe	
Address: Lane End Surgery, 2 Manor Walk, Benton, Newcastle Upon Tyne, NE7 7XX	
Tel: 0191 2667852	
Fax: 0191 2666241	
Work	
Occupation: Business Seceretary	
Employer: Morrisons PLC	
Employer Address: 200 Two Ball Lonnen, Newcastle-Upon-Tyne, NE4 9SZ	
Employer Phone: 0191 2863080	

Patient Information

This page has stayed the same, as there were no improvements needed, apart from changing the "Patient Number" text to "MRN Number"

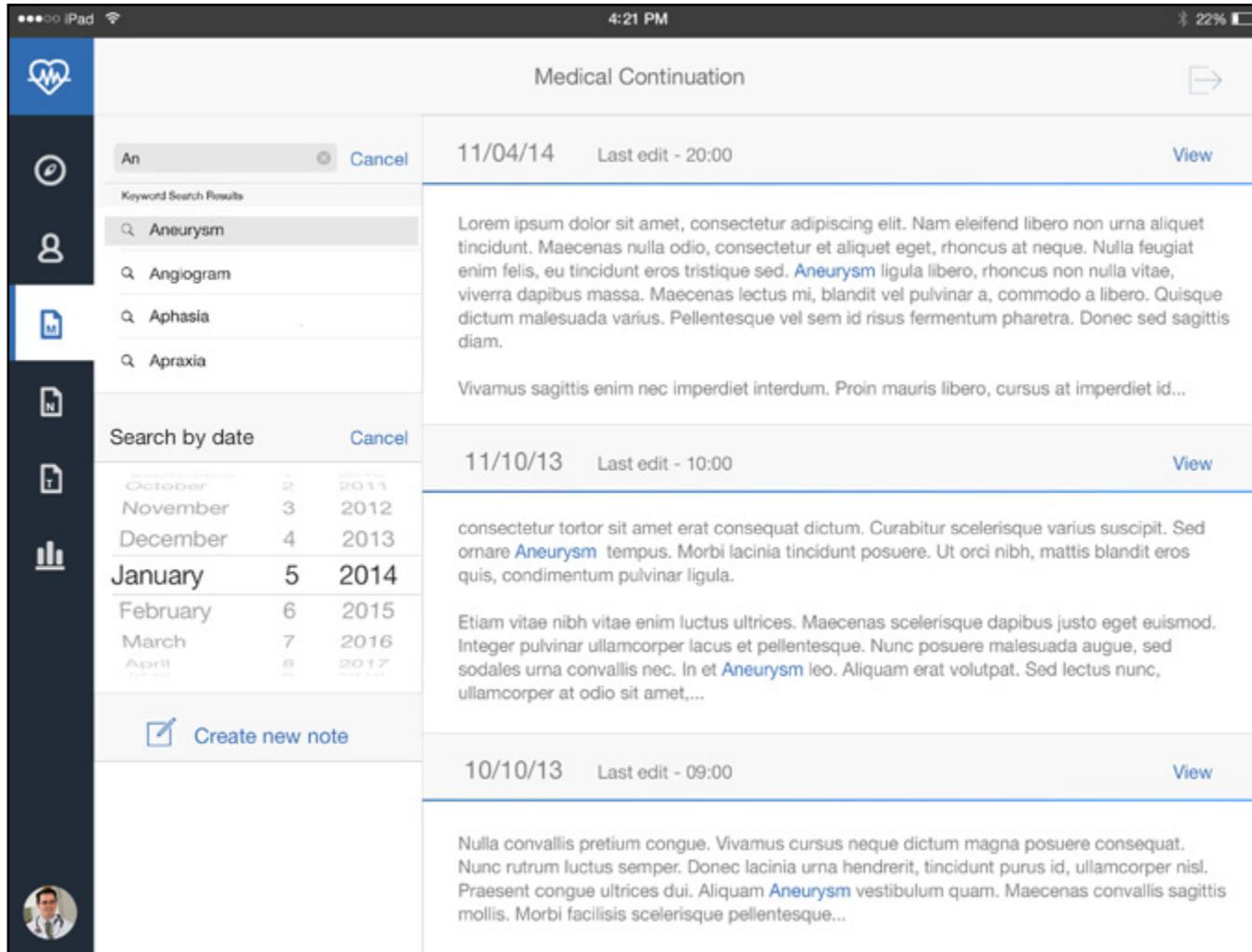
Final Mockup - Medical Continuation



Medical Continuation

This page has been changed to incorporate the new navigation. Also to make the page a little more colourful, a coloured bar has been added at the top of the page underneath the header bar.

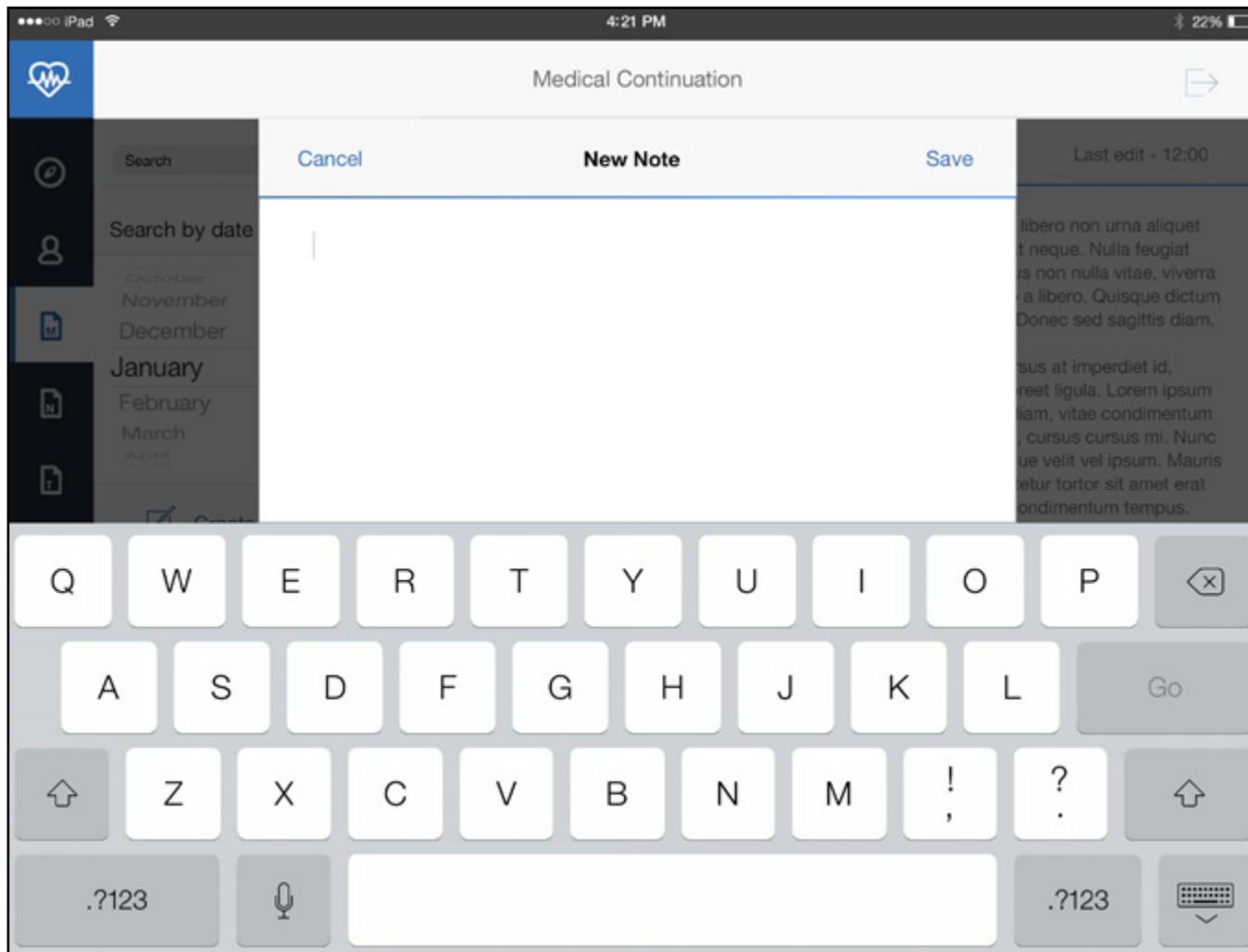
Medical Continuation - Search Term



Medical Continuation Search

This is the view the user will be presented with when they search for a medical term. The relevant notes will be displayed, along with a snippet on text with the searched word highlighted.

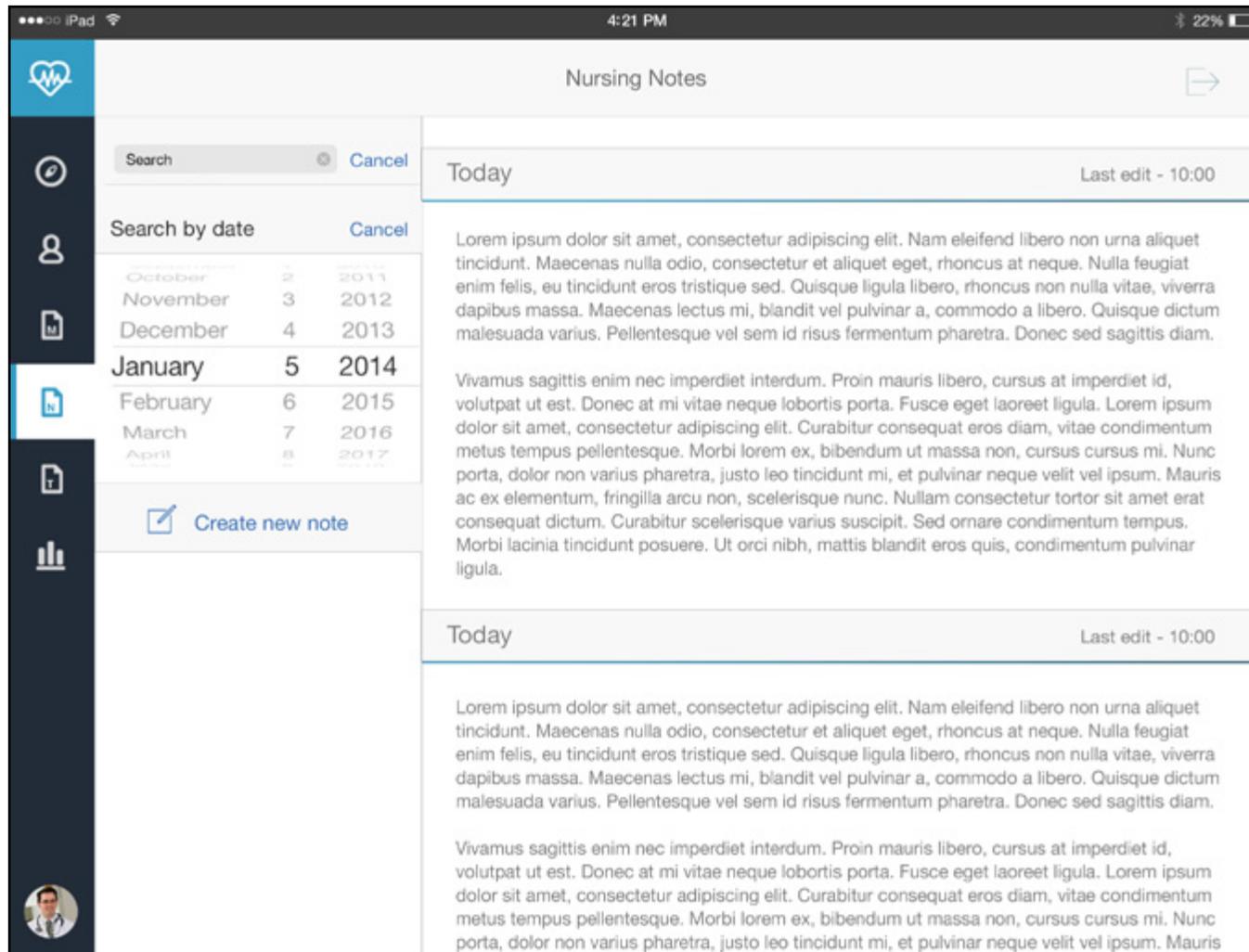
Medical Continuation - New Note



Medical Continuation New Note

This page has not changed from the previous designs, apart from the addition of the coloured bar at the top.

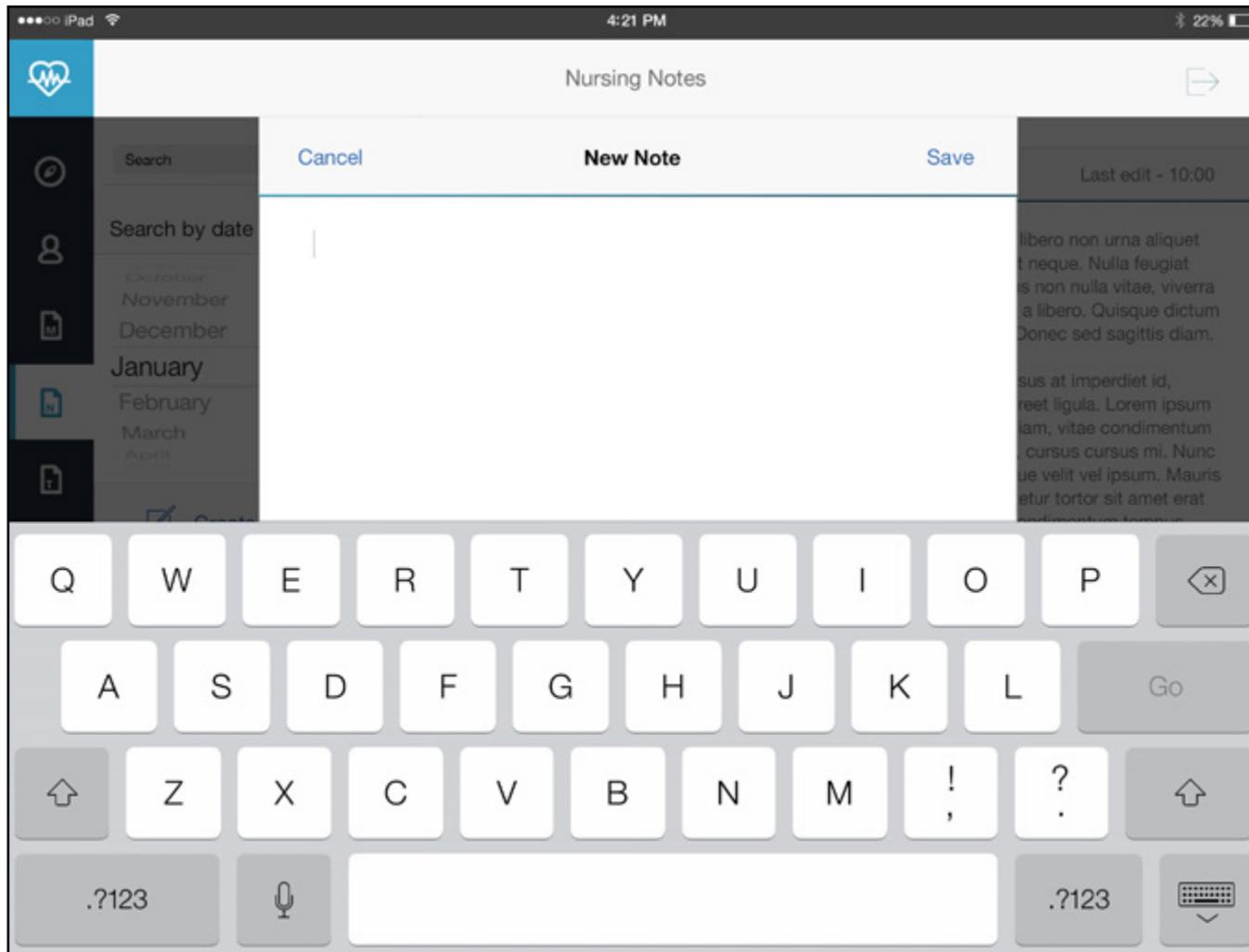
Final Mockup - Nursing Notes



Nursing Notes

Here is the final view for the nursing notes. This section is similar to the continuation, but with different colours and notes. This page will also have the search function working in the final prototype.

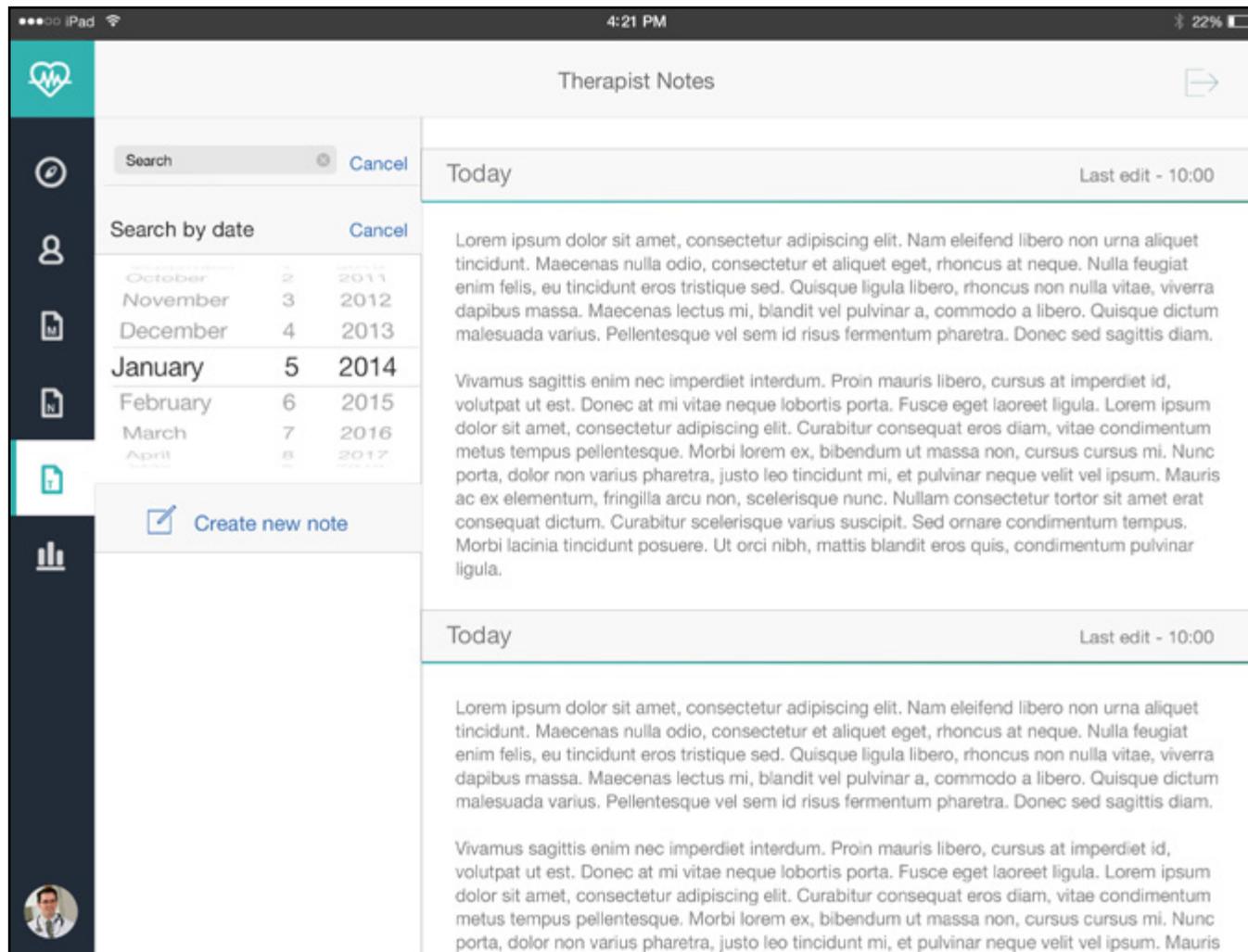
Nursing Notes - New Note



Nursing New Note

This page has not changed from the previous designs, apart from the addition of the coloured bar at the top to notify the user they are in the Nursing section.

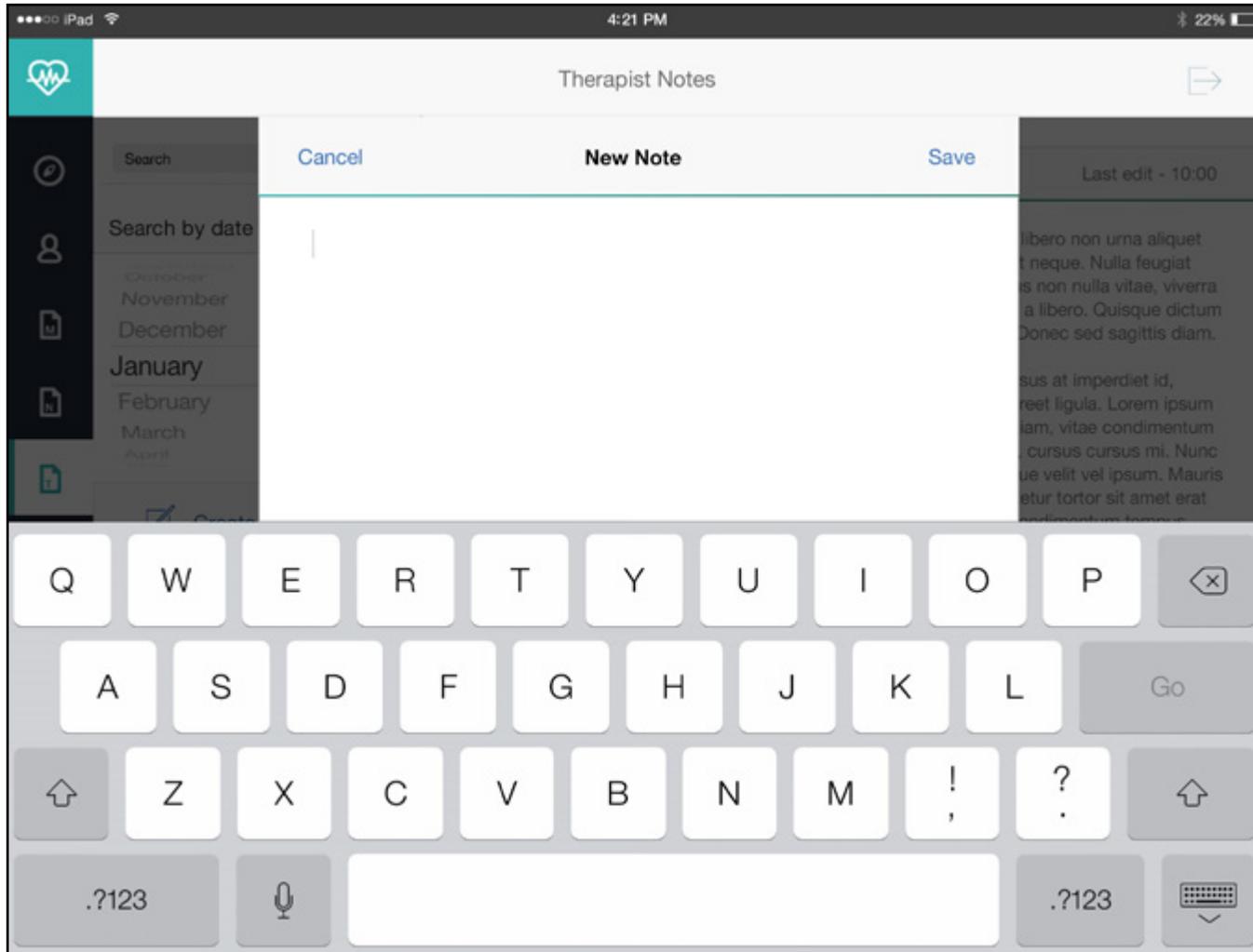
Final Mockup - Therapist Notes



Therapist Notes

Here is the final page for the therapist notes. Again similar to the continuation and nursing notes but with the therapist content. This page will also have the search function working in the final prototype.

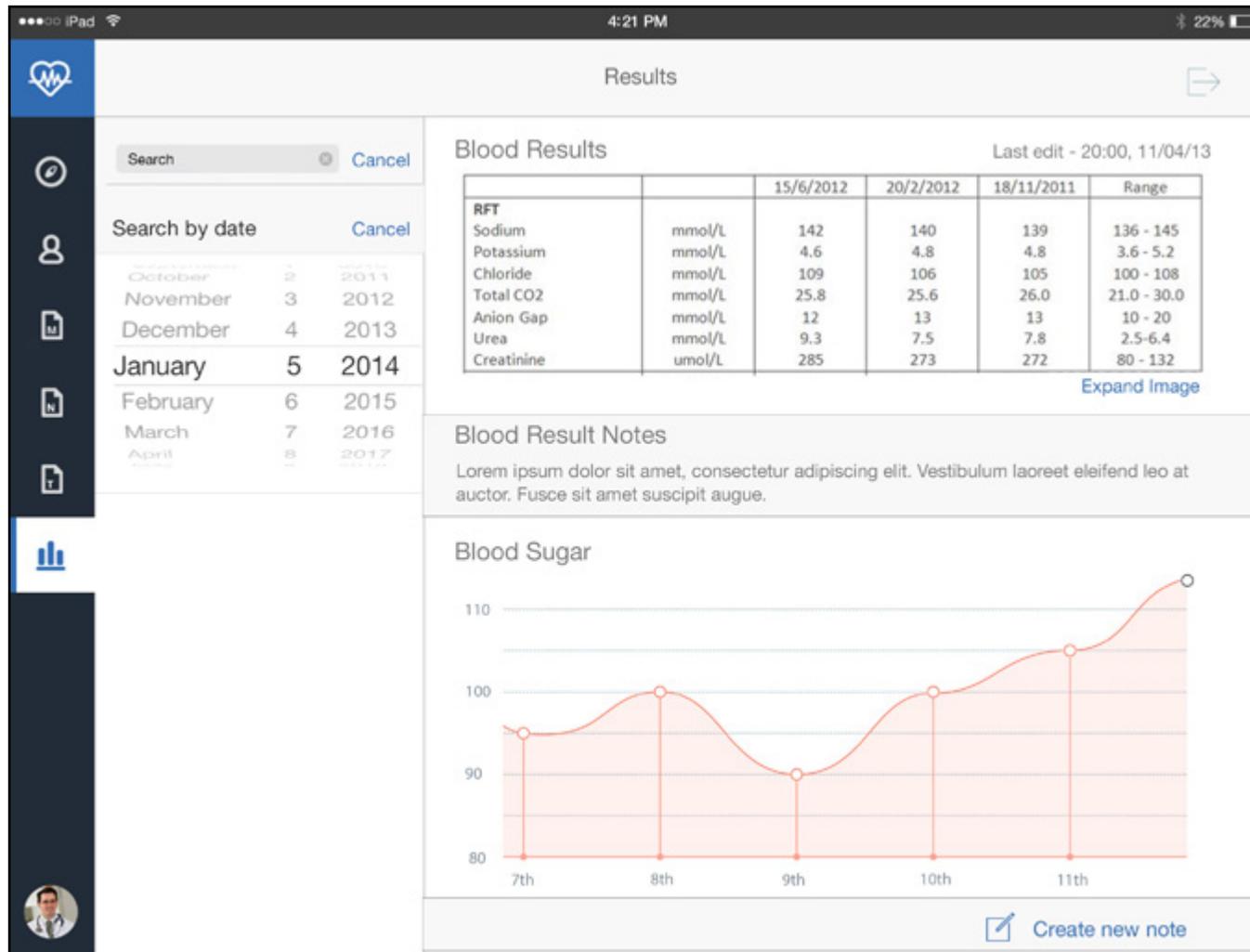
Therapist Notes - New Note



Therapist New Note

This is the view for typing in the Therapist notes, again with the coloured bar to show the user what section they are in.

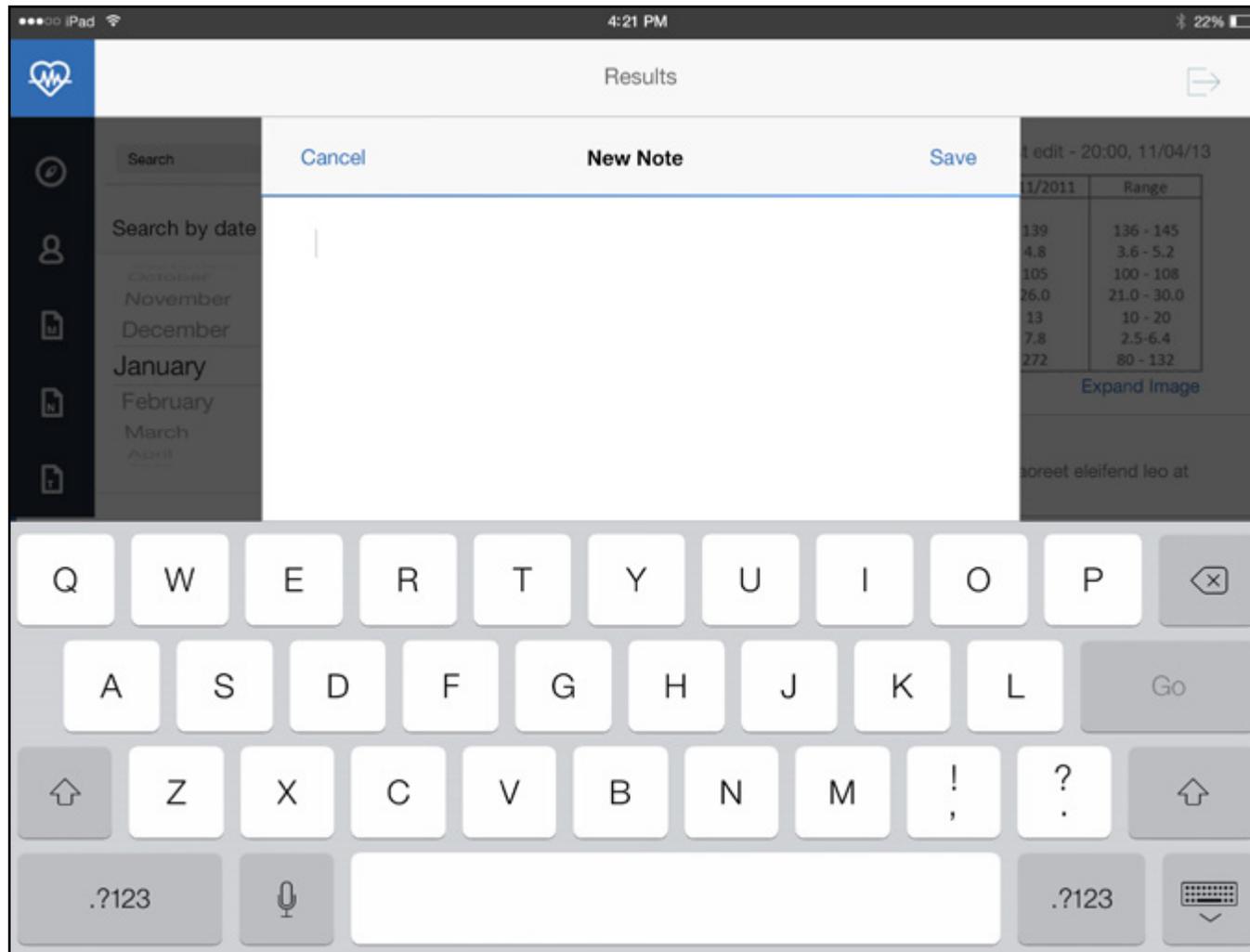
Final Mockup - Results



Results

Here is the results page incorporating the new navigation system on the left. Also, it is not visible on this image, but this page is scrollable and includes other results that are needed on the stroke ward, such as scans and other blood results.

Results - New Note



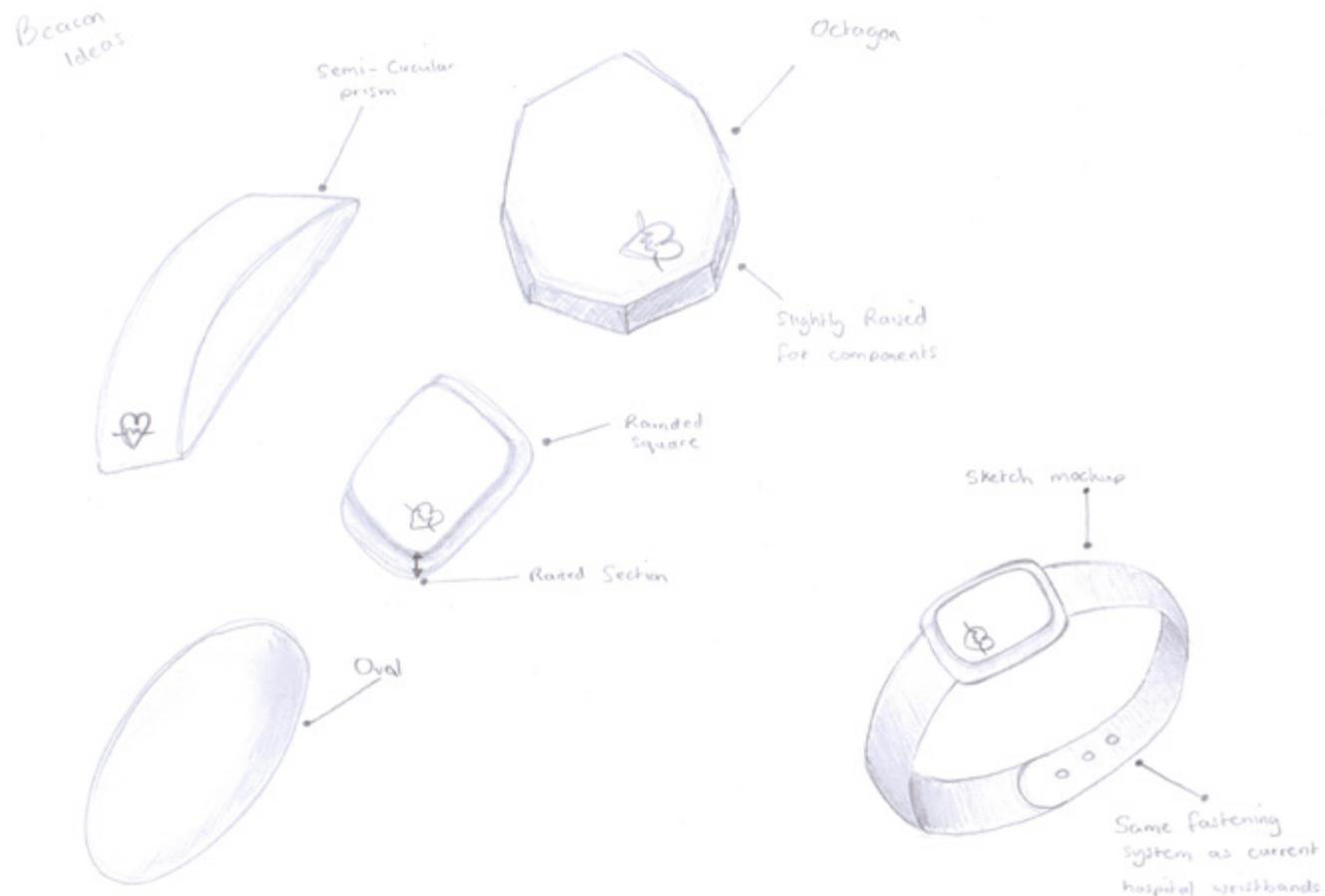
Results New Note

This page has not changed from the previous designs, apart from the addition of the coloured bar for a little more colour.

Please find file named "index.html" in project assets folder. This will take you to an interactive web page of my application.

High-res images can also be found in the "Final Mockups.pdf" file.

iBeacon Mockup - Sketches



Since this project is also focusing on iBeacons, I wanted to take some time to design the possible look of these beacons. Currently, patients that are admitted to wards receive a printed bracelet that has some of their information on, this includes the patient name and number they are given.

I began by sketching a few ideas for the shape of the beacon, as they can be housed in almost anything. I wanted something that looked modern but was subtle enough for it not be noticed and so that it did not get in the way. I decided that the best for this was a small square that was slightly raised.

iBeacon Mockup - Rough Mockup



Here are a few mock-ups of what the iBeacon could look like. It can either be fixed onto the current bracelets, or even it could be made attached to a rubber or plastic strap.

However this material would need to be a safe material that would not cause any risk of irritation, and also it would have to be waterproof, as the patient may have to shower whilst wearing these devices. Luckily iBeacons are waterproof to some extent so this won't be a problem.

The beacon will be fairly small, only a few centimeters across, and only raised slightly, again to make it as discreet as possible.

The beacon will also have the app identity on it, to ensure that people know what they are used for and so they are not misplaced or confused with any other iBeacons.



iBeacon Mockup - High Fidelity



Here is a more realistic representation of what the iBeacon would look like on a bracelet, unfortunately I do not have any 3D modeling software and so my Photoshop skills have had to do to create this image. It still gives a good idea of the size and overall look of the bracelet.

The beacon itself will be about the size of a scrabble letter to ensure that it is small enough to not get in the wearers way. And the band will be a one size fits all rubber band, this would stretch over the wearers wrist to create a comfortable fit!

This band will completely remove the need for the user to wear the current bands with information on.

For this idea to become a reality, each hospital would have to input the information onto the beacons when they know that a patient will be admitted to ward. That way they beacons can be handed out and secured on arrival. There is already a department in place that prints off the paper wristbands. This department would have to undergo training in order to make this possible in an actual hospital.

Promotional Video Creation

To begin with my promotional video I thought about how it would be best to show my application and its functions. I decided this would be easiest through a promotional video with a voiceover. That way I can describe parts of the app and how the solution as a whole works - this would be far too much to show in text and I would not be able to get the whole story across.

I began in after effects for my video. I have used footage from a hospital that I have gained from YouTube. This footage is a nice time-lapse of hospital corridors and wards. I have used this footage mainly as a background, with videos of my app layered over the top.

I used a screen recording of my app in proto.io to show the interactions of the app, I really liked the preview mode on proto.io and how this showed the cursor and tap interactions. I then made this appear on an ipad to make it look more realistic.

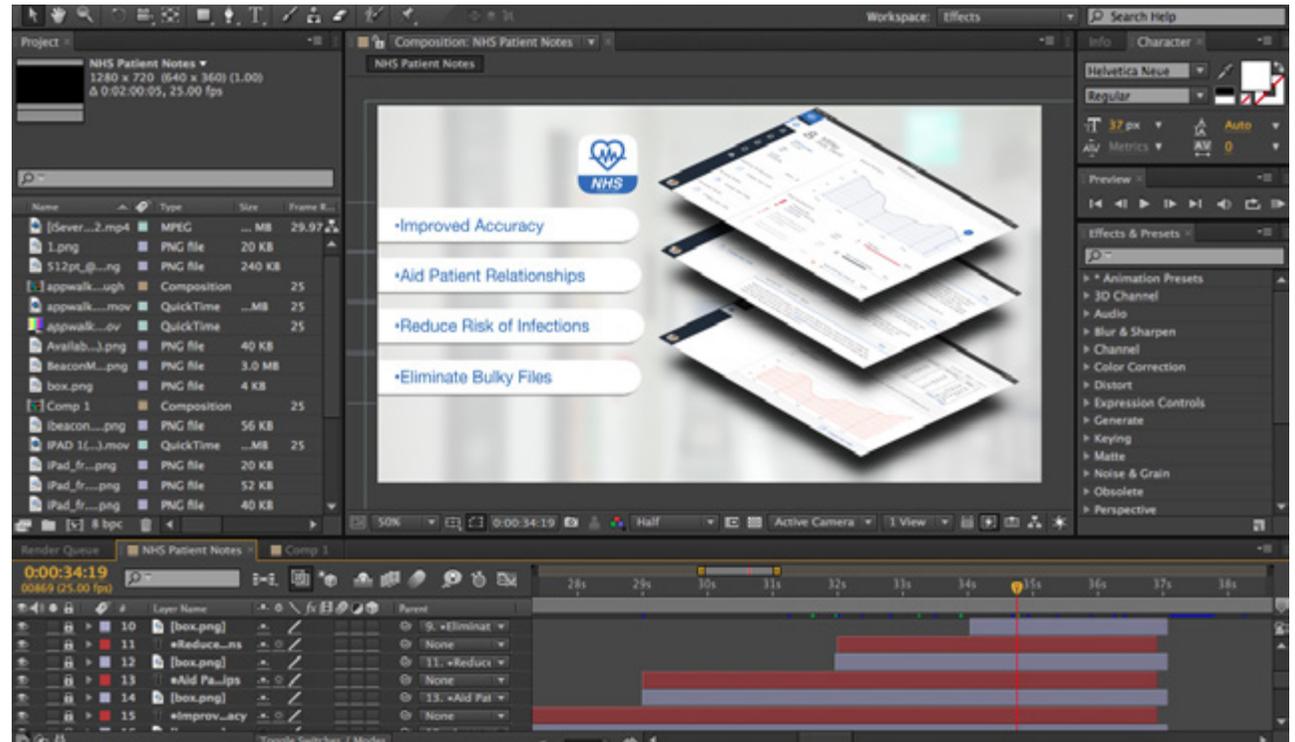
I used after effects for the animations of the video and to edit the background video and text. I also used a separate composition to show the app being used on an iPad, which I then transferred into the main composition to show it over the background video.

Video footage sourced from:

<https://www.youtube.com/watch?v=HyDVgmgS-Go8>

User: SeveranceHospital

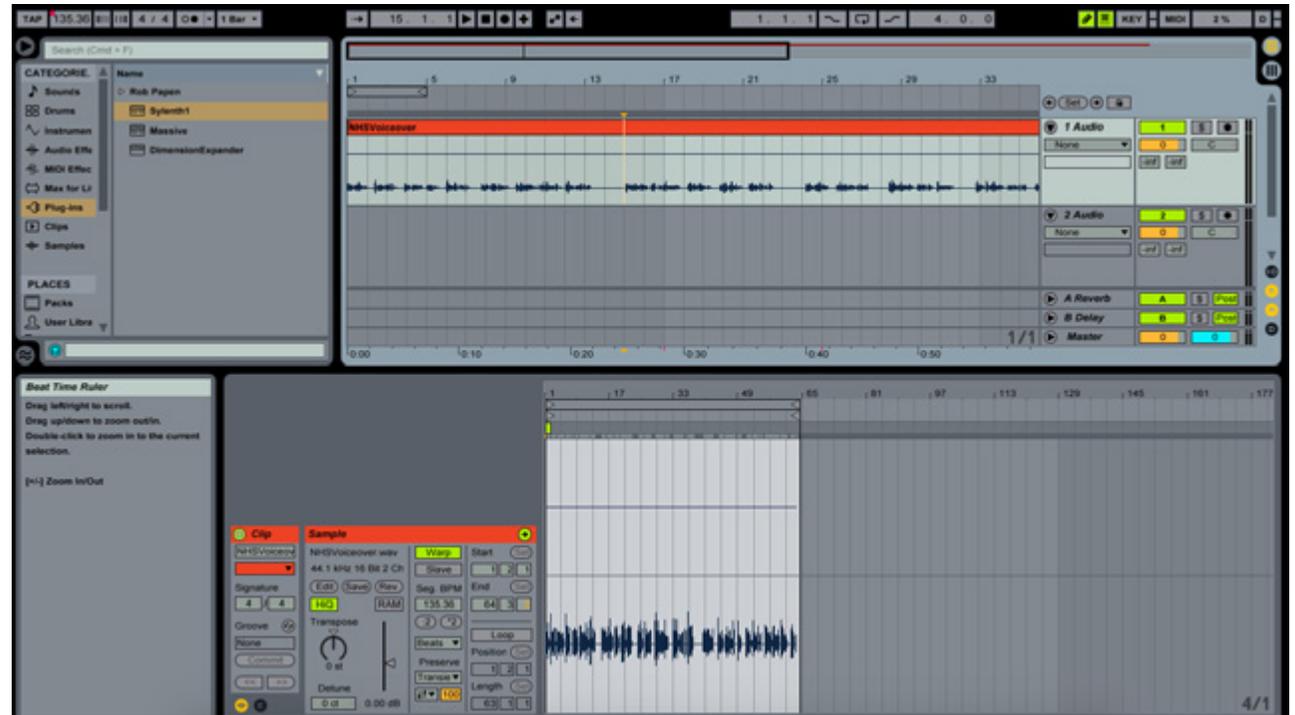
Date accessed: 30/12/14



Once I had a basic layout and I had everything animated at the correct times, I began to record the voice over.

I scripted out the lines to make sure that the final recording was quick and spoken with confidence, I also made sure that the voice over related to the information being shown on screen. I wanted to talk through the whole app and show how a user would navigate through. I also wanted to describe how the i Beacons would work alongside the app to give the story a little context.

I hired out a Tascam recording device to ensure that I had a professional sound quality. After recording my lines, I opened up the sound file in Ableton Live. In this program I edited the sound to cut out any accidental noise, such as breaths and I also used a few effects to reduce the background noise and white noise that had made it into the recording. This proved to take longer than expected, however the final result sounds clear and of high quality.



Once I had the voice over finished, it was time to put everything together. I found a backing track that went well with the concept of the video, it is a nice piece of piano music by an independent music producer on YouTube. They allow free use of their music on student projects so it was perfect for me.

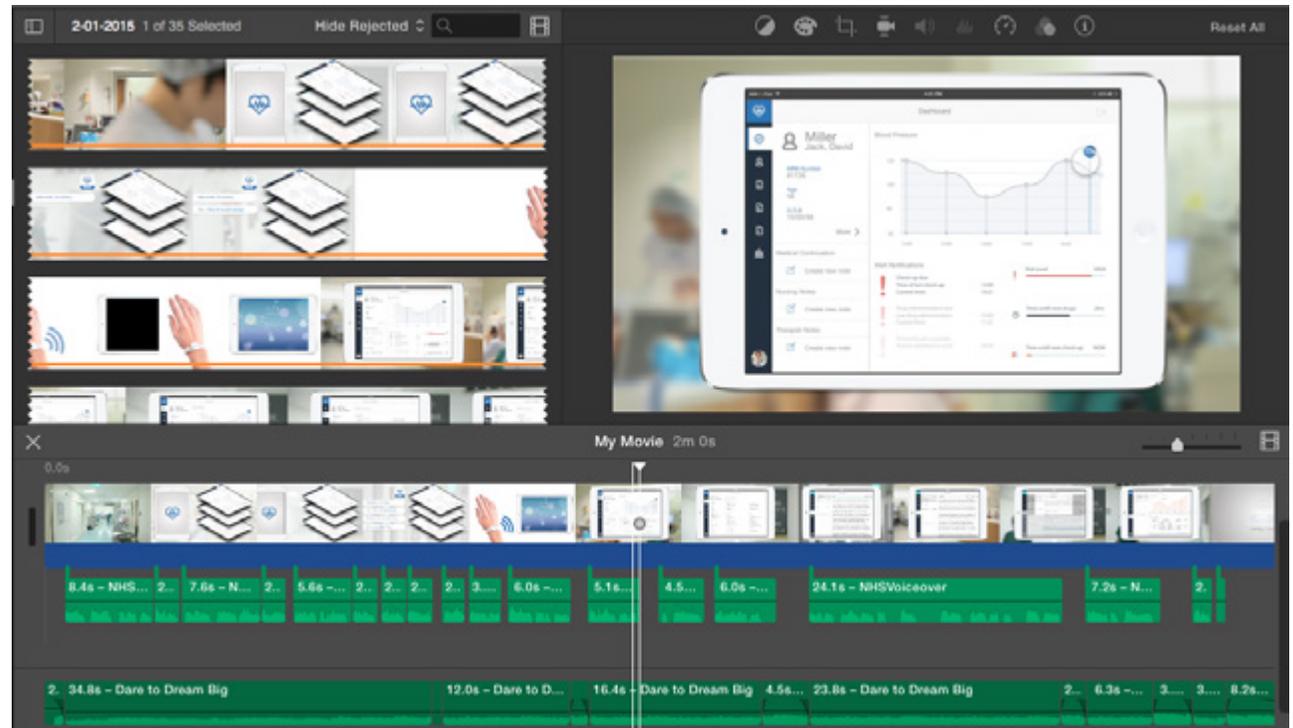
I took my after effects animation and the soundtrack into iMovie, along with the voice over and began to cut up the two audio files to ensure everything fitted together well.

Once everything was in position I added some 'ducking' to the voice over track, this lowers the backing music down to around half the level whenever a section of the voice over plays. The preset in iMovie was awful and so I manually lowered the sound levels on the backing track to make it sound better.

Once that was finished my video was complete. I decided to use these 3 pieces of software because they all have pro's and con's in certain areas and where one program lacks, another excels and so they all work well together!

Soundtrack sourced from:
<https://www.youtube.com/watch?v=6NnUIP2YLB-w&list=PL87A05BAECA6DB23C&index=3>
User: thesecession
Date accessed: 30/12/14

Please find video on disk provided.



Final Comments

To conclude, I believe this project has been very successful. I have particularly enjoyed the challenge of designing an application that I am completely unfamiliar with and for users that I have no experience of designing for! This has been tough, but I have taken a lot from talking to actual users. This was especially the case with the user testing, I made so many changes because of the user testing sessions which shows how important they are, any small problems were ironed out quickly and also some large changes were made, such as the search functions. This app was always going to be heavily user based, and I believe that I have designed and tested a plausible design that functions well and also looks like a health-related application.

I believe that I have tackled my proposed design problem well, I am well aware of the past attempts of making the NHS paperless and the huge failures that these attempts have been, however I believe that my solution is one that is definitely possible if the NHS is to become more digitalized. Even though it is quite an optimistic design pitch, I think that it is a possibility in the near future thanks to developments in technology.

I also think that the data from the app can be used in beneficial ways. With everything being electronic the app could be a huge help to patient complaints. If a patient has any complaints about negligence then these claims can be checked out, as everything will automatically have a date and time on.

I have also expanded my knowledge in iBeacon technologies after doing extensive research into them and how they work, I think they are very interesting and I expect to see a substantial growth in the user of these technologies over the next few years.

If I had more time to complete this project or start over, I would probably look deeper into other aspects of the application. For example I think that there is room to expand the app to other departments of the hospital, and also I would have liked to have incorporated a sharing function into the app. This could be useful for trainee doctors and nurses - they too could have an ipad and the person supervising them could share files and their view with the student through a button or a certain gesture.

I would have also liked to have looked into the design of the iBeacon more. I believe that the designs I have produced are satisfactory, however I would have liked to have a go at doing some 3D renders of the actual beacon and maybe 3D printed it out to give a better visualisation, however due to lack of time this has not been possible.

Overall I am happy with this project and my designs reflect the research and user testing that I have conducted.