Patient All-In-One Dashboard

Donny (Xi) Wu, Xiaoting (Ridge) Zhang

January 17th, 2020

Dr. Lyn Bartram

External Supervisor

Shaolin Tsui, Manager of User Experience and Visual Design System Optimization

What is Fraser Health

The Fraser Health Authority is one of the six publicly funded health regions of British Columbia (see Figure 1) and one of Canada's largest and fastest growing health authorities that provide services to 1.8 million people (Fraser Health Authority, 2020). They have over 26,000 employees, 2,900 physicians and over 6,000 volunteers.
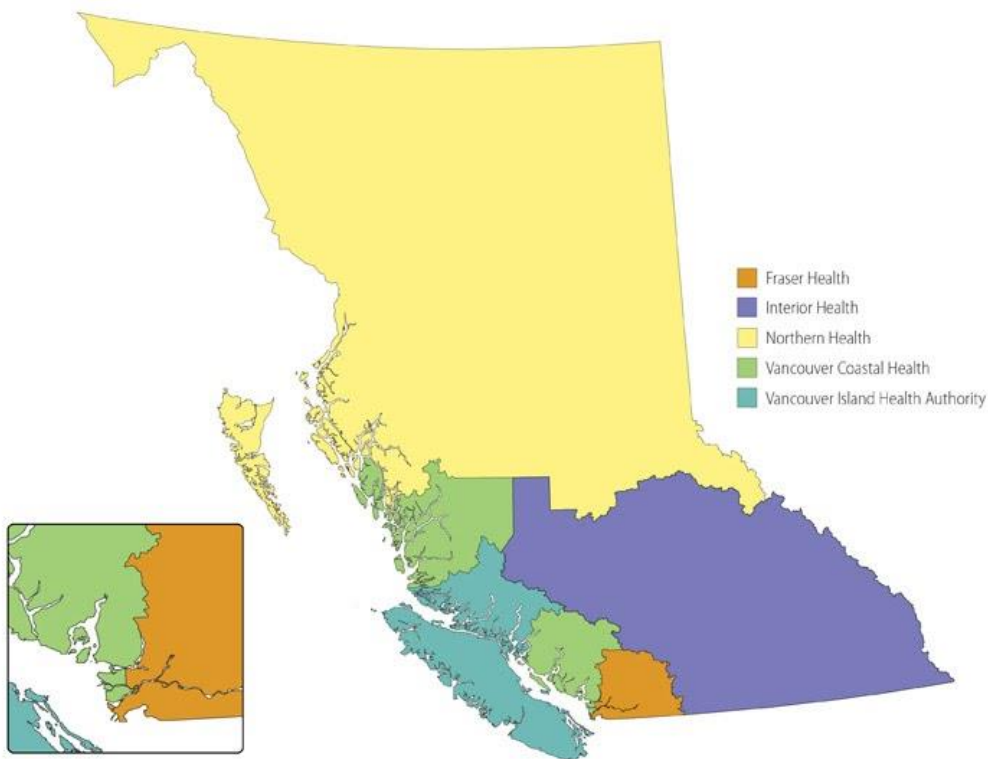
Figure 1: There are 6 health regions and 5 of the 6 are shown on this map. Image from

Government of B.C.. (2020). Retrieved from https://www2.gov.bc.ca/gov/content/

   health/about-bc-s-health-care-system/partners/health-authorities/regional-health-

   authorities

Weekly Meeting Times

11:00 to 11:30am with Shaolin and Lyn, and 12pm onwards with Lyn if necessary.

Introduction

Currently, there already exist many Patient All-In-One Views where patients can log on to see their own clinical information such as lab results, medical imaging reports and clinical notes, share the records with family members and communicate to make appointments, and the one that is used in Canada is called MyChart (MyChart, 2020) (see Figure 2).

Another examples that we have looked at are the Patient Management System (Multitech, 2013) and OPD+ Clinic Software for Consulting Doctors, Physician, Family Physician, and General Practitioner (Prajapati, 2011). Currently, the other two are not used by Fraser Health, but they serve as ideas to inspire us to innovate new designs.
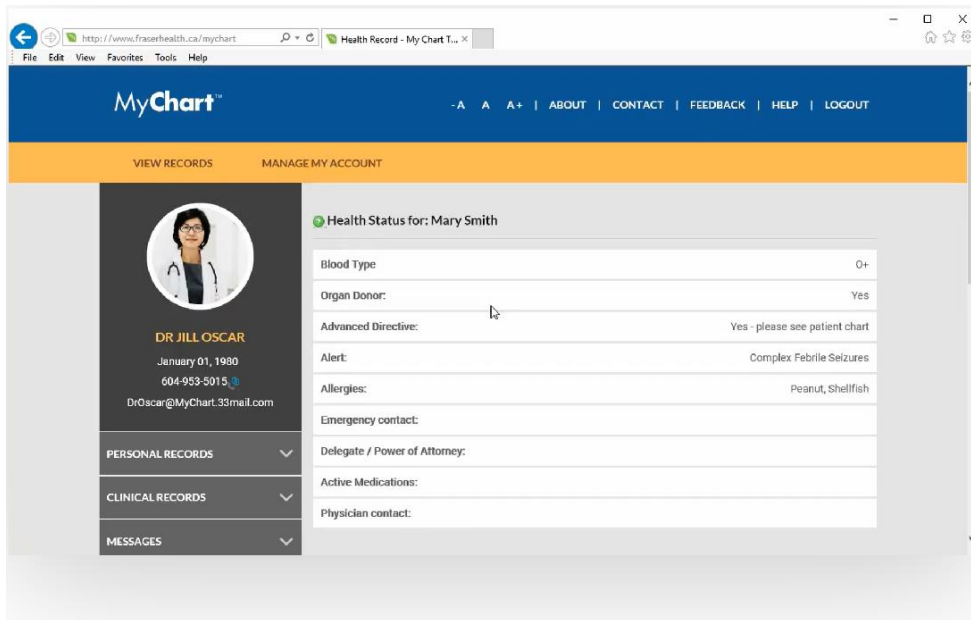
Figure 2: This is what the doctor can see about the patient on MyChart and the contents are fairly simple. Image from Government of B.C.. (2020). Retrieved from MyChart. (2020). WELCOME TO MYCHARTTM. Retrieved January 16, 2020, from

https://www.mychart.ca/

Although we are trying to improve the patient's interaction with their data, being a bonus functionality, the main purpose of this project is to innovate new ways for physicians to access the patient's data; hence, the primary target are the physicians and doctors. Having a patient view will be considered as a bonus functionality but we will also design one for them. By doing so, there will be consistency on what the physician sees compared to what the patient sees, and this can bridge the connection between the patient and the doctor.

Through our visits to different physicians, we have noticed that some are old fashioned, using pen and paper to record data, while others use the computer.

According to research from the University of Kansas and Central Florida, a uniform Electronic Medical Record (or EMR) can significantly reduce medical errors and cut healthcare costs, as physician data tend to be written in a traditional manner while nurses or other personnel enters data into an information system (Ilie et al., 2007). A decade later, similar research was also conducted on the electronic documentation system stating that the quality of free-text subsections was significantly higher in the electronic vs paper notes with a score of 93 vs 78 with 100 being the highest score, assessed by the QNOTE instrument (Jamieson et al., 2016). Aside for accuracy, using paper will result in difficulties finding through all the data as papers can be lost, hand writing might now be readable by other doctors, and so on, increasing the complication for the physician. Through research done by Fraser Health and Shaolin, they have already identified that a Patient All-In-One View is necessary for the physician so they can relate all the information related to the patient on a single page to understand the entire patient episode of care at a glance.

Design problem

A patient's information is recorded in different mediums such as EMR, paper scans, dictation, and is stored in multiple systems, which makes it difficult for a physician to easily understand the full journey of a patient throughout their episode of care. A physician would need to pull the patient's medical history, notes, lab results, and other information from multiple locations, then piece them together before having enough context to provide the ideal care for the patient. Not only does this allow preventable errors, but it will also be time consuming resulting in a larger capital.

Proposed Solution

We proposed a consolidated patient-centric view that encompasses all of the information from the patient's episode in a single view. The physician should be able to pull up the patient's name and be able to see the patient's basic information, past visits, past and current comorbidities, physician and nurse notes, current location (in which hospital or bed number), current status, and may include patient submitted data. The final prototype will be programmed with HTML, CSS, and Javascript, resulting in a resizable website.

Stakeholders

The stakeholders for this project includes Fraser Health decision makers because they will decide whether this new patient view will be implemented, the design team of Fraser Health since they have the power to persuade the policy makes of Fraser Health on whether they should adapt to this new system or not, and the users, which in this stage, will include clinical physicians, physicians, nurses, and doctors.

Users

The users will include physicians, nurses, and doctors. The patient is also an user; however, a design to help them navigate through this system will be a bonus functionality since services like MyChart already exists. Furthermore, Fraser Health is following the Strategic Patient Oriented Research, where patients should be included in the user list. Our focus or the primary functionality of this project is a view for the

physicians and as for the patients, we will design a view that is similar to the MyChart patient portal.

Detailed Timeline

Note for the timeline, we are labelling the last day of the week as the day that lecture, so our categorization of a week is a week ahead of SFU's version. This way, it is more convenient for us to keep track of what to do during the week leading up to the lecture (see Figure 3).
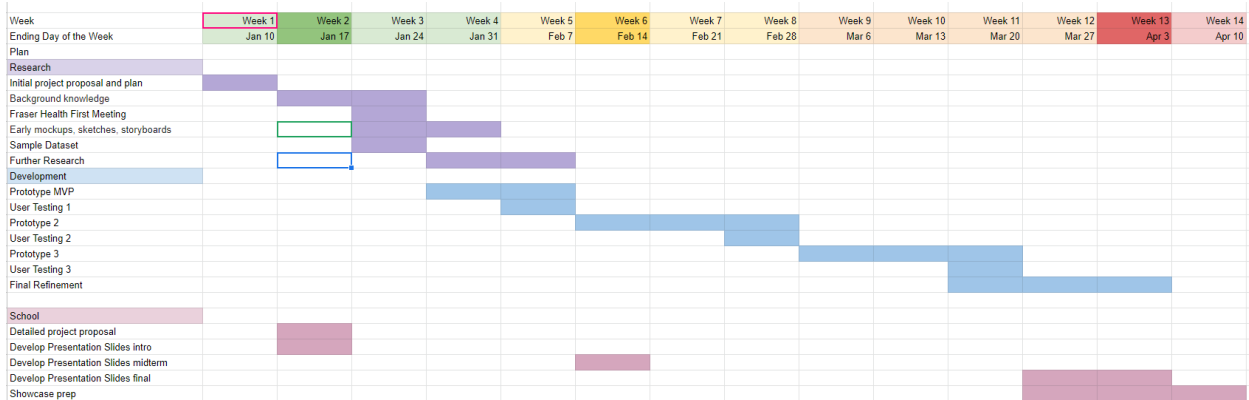
Week	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Ending Day of the Week	Jan 10	Jan 17	Jan 24	Jan 31	Feb 7	Feb 14	Feb 21	Feb 28	Mar 6	Mar 13	Mar 20	Mar 27	Apr 3	Apr 10
Plan														
Research														
Initial project proposal and plan														
Background knowledge														
Fraser Health First Meeting														
Early mockups, sketches, storyboards														
Sample Dataset														
Further Research														
Development														
Prototype MVP														
User Testing 1														
Prototype 2														
User Testing 2														
Prototype 3														
User Testing 3														
Final Refinement														
School														
Detailed project proposal														
Develop Presentation Slides intro														
Develop Presentation Slides midterm														
Develop Presentation Slides final														
Showcase prep														

Figure 3: This is a detailed timeline.

Week 1

We have presented the first presentation outlining what our project is about, introducing ourselves, and our faculty mentor. We have received feedback on figuring out when we will have access to the Fraser Health sample datasets, when will we schedule the user testing with Fraser Health and who our target will be, family physician or walk-in clinics.

We have taken the following feedback into consideration when establishing the Timeline.

Week 2

The most important task this week aside from creating this timeline and the updated presentation was having our first meeting with our supervisor Lyn on Wednesday at 12pm. During the meeting, we have discussed preliminary steps to take in order to ensure this project will be the best it can be as well as set up weekly meeting times with Shaolin, the manager of User Experience and Visual Design System Optimization.

First, we should find existing patient views and critique what is wrong with it. By doing so, we will get an idea of what our design should look like and what kinds of data will we need to achieve it.

Second, we have been ideating questions which we can ask Shaolin during our first weekly meeting next week at 9:30am. This set of questions will allow us to precisely define the details and ambiguous sections of this project (see Appendix 1).

Prior to our meeting, Lyn has told us that we will have a team of people from Fraser Health can help us with the user testing aspect of this project, but we may not have access to physicians. In addition, we will receive a sample dataset by Week 3 or Week 4. Before receiving the data, we can still create sketches for our prototype.

Week 3

This week, we will have our first meeting with Shaolin and we should have a copy of the placeholder data. However, possession of placeholder data by this week is not a guarantee at this stage. We will also begin early mockups, sketches and storyboards. Since we are going for quantity over quality this week, our early mockups will not be coded, only sketched.

Week 4

This week, we are splitting the week into two phases, super rough prototypes and begin building our first prototype. The difference between this week and last week is that the rough ideation and prototypes for this week will be programmed rather than sketched. Last week was pure sketching and ideation.

Week 5

During this week, we will continue to build our prototype. We will also be doing a user testing this week to figure out what is not working and what is working well so we can refine it for the midterm presentation.

Week 6

During week 6, we will spend the earlier days of the week making adjustments to our first prototype, being prototype 2. We will also be debugging code because we expect

there will be errors from last week. During the latter portion of the week, we will be preparing for the midterm presentation.

Week 7

Similar to week 6, we will be making adjustments to our prototypes. Rather than calling a new prototype we will simply refer to this week as updating the prototype. We will be meeting with Lyn and Shaolin to refine this project.

Week 8

During this week, we will have another major user testing. As previously mentioned, we will not have access to people who can help us with user testing every week, but we will have time to talk with Shaolin about our weekly progress and ask for critiques. After this week, we will begin our third major refinement.

Week 9

This week will mainly be working on refinements on our new prototype, after receiving feedback from the previous week.

Week 10

This week will be similar to the last week. The description for this week may sound simple, but a lot of refinements in coding will take place. We will also be debugging the code.

Week 11

This week will be our last, being the third, major user testing. The feedback received this week will be processed into our final refinement which will be displayed during the final presentation and the showcase.

Week 12

We will be working on our final refinement. In addition, we will be thinking about our final presentation, developing a final presentation slide, and a screen recording of our prototype which can be lopped during the showcase. The screen recording will also be annotated resulting in a self-explanatory video. We will also be debugging code.

Week 13

Similar to last week, we will be working on the same content. This week, we will be focusing more on the video and presentation portion as the majority of the final refinement should have been completed last week.

Week 14

Everything should have been completed already and this week will simply be preparing for the final showcase.

Roles

Donny will be responsible for slide design of all the presentations and Ridge will be responsible for all of the reports and writing.

Considering that this is a small group, and we have worked together in multiple classes, we do not need to divide particular tasks. We will cover for each other when necessary. We will both be responsible for user testing, sketches, prototypes, programming and the final video demonstration of this project.

References

Doyle, R. J., Wang, N., Anthony, D., Borkan, J., Shield, R. R., & Goldman, R. E. (2012). Computers in the examination room and the electronic health record: physicians perceived impact on clinical encounters before and after full installation and implementation. *Family Practice*, *29*(5), 601–608. doi: 10.1093/fampra/cms015

Ilie, V., Courtney, J., & Slyke, C. (2007). Paper versus Electronic: Challenges Associated with Physicians - Usage of Electronic Medical Records. *2007 40th Annual Hawaii International Conference on System Sciences (HICSS07)*. doi: 10.1109/hicss.2007.424

Prajapati, J. (2011, May 4). OPD Clinic Software for Consulting Doctors, Physician, Family Physician and General Practitioner. Retrieved January 17, 2020, from https://www.youtube.com/watch?v=wi7jCIzGREA

Multitech, D. (2013). Patient Management System. Retrieved January 16, 2020, from https://www.youtube.com/watch?v=0L2_4BWwSLc

MyChart. (2020). WELCOME TO MYCHARTTM. Retrieved January 16, 2020, from https://www.mychart.ca/

Appendix 1: List of Questions for Fraser Health

1. When will we have access to a sample dataset?

2. Who are the Stakeholders?

   a. Decision policy makers for Fraser Health

3. Who is the primary target and who will use this?

   a. Family physicians?

   b. Clinics?

   c. Will the patient be able to access it?

   d. Who will we be doing user tests with?

   e. Will the patient be able to see the data and use the patient view

   f. Will they be able to see physician or nurse notes?

   g. Will they only have access to certain data?

4. Does the physician understand everything related to health?

   a. Is it practical for X-rays or ultrasounds to be shown for them or they will

      not understand the raw data?

   b. Will the view only show very rough outlines on the details of the

      information rather than a collection of raw data?

   c. If the patient will see the data, will they be able to understand the data?

5. What are the main sources of data?

   a. Data from labs (highly accurate) as well as doctor notes(less accurate)?

   b. Data from interviewing the patient (what they tell the doctor, not always

      true)?

   c. Should the view contain only the most credible data?

i.   Eg. doctors may give diagnose before testing saying it might be this or that. After testing, there is only one illness, should the doctor's diagnose be deleted since it is not needed?

6. Are physicians obligated to use this software or can they still use pen and paper

   a. If so do they scan and upload the data?

7. Format of the data

   a. How is this getting inputted? Raw source of data?

      i.   Text field input?

      ii. Checkboxes?

      iii. Handwritten scans?

   b. Schema of data?

   c. Structure of data

      i.   Nested per patient? Per visit?

   d. Json, CSV, SQL db dump? How is the data given?

8. Physical design

   a. HTML resizable prototype design

9. What data can be shown to who? Is there a permission system, security clearance?

10. "Strategic Patient-Oriented Research"

   a. Fraser Health is a SPOR Node?

11. What are the touches of the system?

   a. What data will the physician have access to about the patient

b. In Fraser Health, the physician will have access to all of the patient's medical records

c. There are data that psychiatrists provide which is part of the whole patient record but not the medical records, will the physician have the right to see it?

d. Can the patient decide what they want the doctors to see?

    i. Cause clients may tell psychiatrists personal information that may be illegal

    ii. Eg, if the patient tells psychiarist that they plan on committing suicide, the professional is obligated to call the police in the U.S.

e. Finding the right balance between privacy and usefulness

12. What is the purpose of the patient all-in-one-view?

a. Allow physicians to easily retrieve information and display all of the information in one view?

b. If there is too much information, which ones to display and which ones to leave out?

c. Is the main purpose just for the physicians to view or any doctor be able to see the same view?

d. Can the patient input details like how are they feeling on a daily basis and their blood pressure?

e. Can the patient publicize or share their results with another family member, if they have access?

f. Can the physician selectively filter data on what they want the other doctors to show and what they want to keep private for the patient?