**Improving the**

**Specialist Referral Process**

Design Computing Studio 3 – Final Report

Project Proposal Report 3

Team Saitama

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# Overview

## Problem statement

Patients looking for help with medical conditions often seek advice from a general practitioner (GP). In many cases however, the GP will refer the patient to a specialist if they are either not sufficiently qualified, or if specialised treatment is needed. The problem is that when this happens, a referral is often immediately made by the GP with limited understanding of the specialisation which the patient needs help in. This is not an optimal situation for patients, and in those cases where less than optimal referrals are made, consequences include months of wasted time and large medical expenses on top of extended suffering by patients from their initial condition.

In this proposal we try to offer a digital solution to aid patients through the specialist referral process, with the ultimate goal of reducing poor referrals.

## Covered in this report

This report is the result of a semester of investigation around the specialist referral process in Australia and presents our final solution proposal along with background research, user studies and design sketches completed over the semester showing our team’s evolution of the problem space and solution concept. We hope that the report clearly demonstrates how the proposed solution of a medical diary app has eventually arrived at after repeated inquiry into our initially vague problem statement through background research and interviews with patients, GPs and specialists.

Report sections include:

* Background research in the specialist referral process and existing solutions
* Stakeholders involved and their power and incentives relating to the problem space
* Studies completed
* Solutions ideas
* Our proposed solution
* A list of questions and areas of investigation for the following iteration
* A project risk assessment

## Iterations this semester

To provide context to this report, we outline here the iterative journey taken by the team over the semester.

### Problem identification

Our project starts with the team having a vague idea of some possibility of improvement existing in the space of medical referrals. Starting from an initially murky understanding of the referral process, we learn about how the process works in Australia, China and Malaysia and also conduct background research on existing digital solutions that assist patients in finding good specialists. We find a numerous recommendation systems and consultation apps, but also raise questions about why these solutions aren’t more popular. We also conduct an initial survey on patient and GP experiences with the referral process, but find that the results of our data are unclear without a deeper understanding of the what happens when patients are referred to specialists.

### Interim studies

To gain a stronger understanding of the problem space, in this iteration we attempt to conduct a comprehensive series of interviews including patients, GPs and specialists. With the majority of interviews conducted being on GPs, we begin to notice that quality referrals are somewhat systematically out of their control. GPs are incentivised to refer specialists within their network, and don’t have time to look at recommendation systems during consultations. As wait time is a common problem mentioned by interview subjects, we propose a solution concept for optimising wait time between specialists.

### Further research and proposed solution

For our final iteration we choose to step back closer to the initial problem, patient experience and interview exclusively patients that have gone through the referral process in Australia. Based on information from our last round of interviews, we also choose to ask patients about their level of trust and communication with GPs and specialists. Here we find that many of our interview subjects have had past experiences where they were unable to communicate well with their GPs or specialists. This led to situations of being ‘trapped’ with a condition, without an understanding for their own medical condition, or further options on specialists they could see. This data is the basis for our final solution proposal in the form of a medical diary.

## Proposed solution

In short, our proposed solution is a medical diary which comes in the form of a medical diary mobile app. This solution attacks the problem of patients feeling uninformed by providing a place where they may note down their experiences while reading about the experiences of others in a similar situation.

Refer to 8.2 for further details.

# Team Reflection

## Project direction and content

### Tutor feedback

The main piece of feedback from the first stage of the project was that it seemed unclear as to exactly who the intended audience of our solution was. Additionally, there were some issues our solution was likely to encounter that had not been considered, such as the financial impact on stakeholders and gaining the acceptance of medical personnel who already had existing referral systems. As such, clarification of our intended audience and further investigation into hurdles and feasibility of the original idea were necessary.

After the second stage of the project, the feedback that our group received was that our solution was too straightforward and that we needed to consider additional ways to help meet the needs of our end users. As a result, the main goal in the third stage was to conduct further interviews to identify any other concerns patients have, aside from waiting times.

### Re-evaluation of topic

In this stage, the interviews revealed that the question of trust and communication between patients, GPs, and specialists was the most serious, as many patients who had poor experiences found issue with the lack of shared information between professionals and the fact that they felt disempowered and uninformed about their options when choosing a specialist. Following these results, our team decided to further investigate a way that patients would be able to share their experiences with others in the form of a medical diary.

## Team performance

### Processes followed

In this stage of the semester, our goal was to conduct interviews, analyse the results, and evaluate our existing solution based on the analysis. For the interviews, we formulated a set of questions together before individually selecting interviewees and recording their responses. The general themes and comments were then extracted and sorted into an affinity diagram, which allowed us to consider and compare the statements from the interviewees. Upon finding communication and trust to be significant talking points, our group met to brainstorm potential solutions and select one to develop further.

### Challenges due to COVID-19 and hybrid flexible/external delivery mode

The main hurdles associated with the team being comprised of a combination of students in flexible and external delivery mode have been related to scheduling meetings and handling communication during them. Finding times to meet is difficult even for smaller groups in the same time zone, let alone when there are six people, mostly external students, spread across three countries with wildly varying timetables. Our current strategy for this has simply been stating our availability and meeting at the times when the most group members are available, with the absent members being informed of details by those in attendance. Ideally, this would have included the whole group; however, for urgent matters it was sometimes necessary to handle the issue sooner rather than with as many people as possible.

Another issue with online meetings on Microsoft Teams or Zoom is that it is much more difficult to encourage participation from the group members less inclined towards giving their opinions. In meetings where everyone is in the same location, it can be less intimidating to speak up, as well as being easier to indicate interest in particular members’ thoughts and opinions. Currently, our system for handling this is just asking for group members’ opinions in meetings; however, there must surely be a better solution.

### Effectiveness of teamwork

Overall, the team has managed to work reasonably well together; however, there are still some hurdles we have yet to overcome fully, and time management has been a consistent issue. It would have been useful to have more regular discussions and meetings to keep up to date on tasks and progress; however, due to time and availability constraints, achieving this has proven more difficult than expected.

# Background Research

This section covers topics surrounding the problem and solution space which we looked into as part of our background research, including existing solutions found in problem identification. As a result of the international diversity of Team Saitama, our research also looked at the specialist referrals systems in Australia, China and Malaysia.

Academic sources are often cited in this research, but a full literature review was not believed to be applicable for this project.

## How specialists are chosen in Australia

Normally in Australia, patients looking to see specialists need to see a GP first. If the GP believes that the patient needs specific expertise for diagnosis or treatment, he will help the patient find a specialist (Seeing a specialist | betterhealth.vic.gov.au, n.d.). The general practitioner may recommend several suitable specialists for the patient, but this may not cover all of the options available to them.

Patients can learn about specialists from sources such as health funds, family, friends, and hospitals, but to understand a range of options available to them, patients must carefully conduct their own research (How to Choose a Medical Specialist, n.d.). According to the Medical Board of Australia, there are 76,456 medical specialists in Australia as of December 2020 (Medical Board of Australia-Statistics, n.d.). Those recommended by general practitioners are limited, and it is difficult for patients to understand all the options available to them and make an optimal choice.

If patients were to attempt to find specialists on their own, there would be many factors that they need to consider. First, they would need to determine the doctors in their area. One way to do this would be to visit the doctor's directory from their health fund to find a local specialist (How to Choose a Medical Specialist, n.d.). Patients may choose to have their own preferences: for example, whether they have a gender preference or need support in other languages. They may also choose to determine the background of the doctor and evaluate the doctor’s qualifications. Finally to be eligible for cover from Medicare, the patient must visit their general practitioner to receive a refer to see the specialist. (How to Choose a Medical Specialist, n.d.). With all these factors to consider when choosing a suitable expert, the process can cost the patient a lot of time and energy, and is especially difficult if they are suffering from some medical condition.

## Differences in China and Malaysia

In Australia, individuals are directed to the relevant specialists by general practitioners (Health, 2018). The same process applies in Malaysia, where individuals are also instructed to see general practitioners before making appointments with specialists.

In China, however, the health system works a bit differently. Normally, an individual will have to make an appointment directly with the specialist (either online or offline) to avoid risking lengthy queue times. The traditional method – in person consultations with doctors – is time consuming and costly (Ma et al., 2018). The problem of finding the exact specialist without wasting time by consulting the general practitioner at first remains in some of these countries. According to a study based on the Chinese health system conducted by Li et al., doctors with higher quality are more likely to do online consultations with patients (Li et al., 2019). In other words, patients are less likely to get information about specialists from general practitioners in the Chinese health system.

## Limitations of the current referral system

According to the journal illustration (Naiker et al., 2017), the challenge that many countries have in the referral system can be summarized to the major aspect of long waiting times for patients trying to access specialist care. The main reason behind this challenge is that demand overcomes supply when it comes to the relation between patients and specialists. Not all patients get treatment immediately and are usually put on wait lists. Thus, the wait list keeps piling up and the challenge remains.

Although there are many studies pointed out that electronic referral system has great potential on improving the efficiency when the patient seeking help from specialist, however, limitations remain in this certain research area. In the article written by authors Naseriasl et al., it examined different electronic referral system that had been developed and implemented in certain countries. Each one of the electronic referral systems had shown success in different level. However, due to the different sociotechnical conditions in the sample countries, the referral solution may not be optimal for other countries. In addition, Azamar-Alonso et al. illustrated that the electronic referral system could bring positive impact on reducing the long-wait time when patient seeking help from specialist, however, more economic evaluations are required in this article. For example, how the financial cost of electronic referral system compares to the paper-based referral system.

## Public and private medical systems

Australian healthcare consists of both a public and private healthcare systems, with the public system being comprised of hospitals and other health services owned by state and territory governments and the private system being owned by entities that are managed privately (Healthdirect, 2020). Medicare covers all or a significant portion of health care costs under the public system, while services under the private system are largely funded through health insurance providers such as Bupa and Medibank (Australian Government Health, 2019). Although this appears apparently simple, this system is somewhat complicated by the fact that patients in public hospitals may sometimes be treated differently depending on whether they are classified as a private patient.

In relation to the specialist referral process, this means that the specialists that a patient can see depends on whether they are insured, and the insurance provider that they are using (Bupa, 2021). This is an important aspect of the problem which must be taken into account in any specialist recommendations provided by our solution.

## Digitised health records

From research by Garrety et al, it may be understood that the electronic health system and health records in Australia are very complicated. As it is important that specialists have a good understanding of patient health records, they are a key consideration that should be taken into account in our designed solution. Due to the lack of transparency about the Personally Controlled Electronic Health Records (PCEHR) system (Xu et al., 2014), further research will need to be continued in understanding how health records need to be factored into our design.

## Existing systems

### HealthShare

A screenshot of a computer

Description automatically generated with medium confidence

Figure 1: The HealthShare website

In Australia, there is an existing website and business called HealthShare.com.au. This website aims to help patients make better choices and provide them with access to experts on health-related topics. On this website, users can find specialists by entering a medical field and suburb, hospital, or post code. The website will then display a list of qualified specialists, and users can view relevant information, including their contact details. In addition, users can view the detailed information of the specialist by clicking on the name of the specialist in the list, including qualifications, interests, costs, and phone numbers.

Undoubtedly, there are weaknesses in the solution provided by HealthShare. For example, users cannot make appointments directly through the internet and must make appointments by phone. As the HealthShare platform also provides no further assistance to patients beyond providing a means to contact specialists, we also believe that the platform may only be used in a phonebook-like manner, where patients must call each listed specialist in order to make a judgement on which to see. We also note that HealthShare provides very little information (e.g. pricing, reviews) to help users decide between specialists.

### National Health Services Directory

Graphical user interface, application, website

Description automatically generated

Figure 2: The National Health Services Directory website

By following links from Queensland government websites, another existing solution found was the National Health Services Directory (NHSD), a government-run directory of specialists used in a similar fashion to HealthShare. The most immediately visible difference between NHSD and HealthShare was the use of a map in NHSD, which makes it easy for patients to find specialists close to them. Another difference we found between NHSD and HealthShare was that NHSD also provides information on general practices, emergency departments, and hospitals. In the top bar, there is also a ‘Home & Virtual Services’ button which provides access to telehealth services.

Comparing NHSD and HealthShare, a question which arises is how HealthShare may continue to operate a business when a similar version of its service is provided at no cost under by a government run service. The existence of HealthShare suggests that there are user requirements that it fulfils which cannot be provided by NHSD. Despite this, it is not immediately clear what these user requirements are.

### 好大夫 (Good Doctors)

Graphical user interface, text, application, email

Description automatically generated

Figure 3: The website for 好大夫

Looking at existing solutions to medical specialist referrals in China, the first solution found was 好大夫 (Good Doctors), a website providing information about specialists across the country. Again, Good Doctors is similar in nature to HealthShare, but we note that this type of service of potentially much more useful in China, where no referral from a general practitioner is required to see a specialist. We also note that Good Doctors provides many of the features which were noted to be missing in HealthShare. Through the platform, users are able to directly book and pay for consultations with specialists that they find, either through online chat or voice calling. Good Doctors then keeps a profile of all practitioners on its website including information such as patient reviews, number of previous patients, and registration date on the platform. It is also interesting to note that patient reviews include details such as consultation purpose, treatment provided, level of satisfaction, and total cost.

Our research on Good Doctors suggests that the platform provides a fairly comprehensive list of specialists in China, including 9600 hospitals and 780 000 practitioners.

### 企鹅医生 (Penguin Doctors)



Figure 4: Screenshots of the 企鹅医生 Mini Program

Another system from China found to be comparable to Good Doctors was 企鹅医生 (Penguin Doctors), which provides patients with access to immediate consultation with specialists from a mobile Mini Program inside of the WeChat platform. By comparison with Good Doctors, Penguin Doctors provides a much cleaner and more modern interface, along with an online pharmacy feature where patients can have medicine delivered to their homes immediately after consultation. It is not immediately clear whether there are limitations on the medicines which may be provided in a process which is entirely online.

### National Specialist Register (Malaysia)

Graphical user interface, application

Description automatically generated

Figure 5: The National Specialist Register website

From Malaysia, the single example found of an existing system was the National Specialist Register (NSR), which provides a list of specialists in the country. The interface of NSR provided limited ways for patients to use the information provided. In the cases we tried in our research, searches on the NSR returned hundreds of pages of results with specialists being sorted by NSR No. It is clear that the NSR is either not intended for public use or needs refinement in its interface design.

## Waiting time for specialists

There are two classifications of waiting time that are very different from one another. The more common definition refers to the time it takes to see a medical practitioner when a patient visits a clinic/hospital, which could go from a couple of minutes up to a few hours. The second one refers to the time it takes for a patient to book a specialist, and this waiting time could go from a couples of days to months. For the context our project we will be referring to the second waiting time.

### Major contributors to waiting time

There are several factors that contribute to long waiting times according to sources including Australia as part of their study. The most obvious reason to long waiting time would be supply and demand, the lacking of doctors and specialist to see patients would be the single largest contributing factor to waiting time. There aren't many other ways to resolve this matter with the exception of increasing the number of specialists available.

The second issue that many specialists and doctors face would be trouble using Eletronic Health Record (EHR). Even though, EHR is only popular in more develop countries, many doctors and health specialist find that using EHR takes up a huge amount of time to find existing patients in their system and are required to update any details about the patients. The problem with EHR is both beneficial and non-beneficial, it is very useful for the hospital to keep track of the patients and is easy for insurance company to help the patient to claim their medical insurance. On the other hand, it is more taxing for the doctor themselves to input all the details and since there is already lacking in doctors should they be the one who input the patient details or should a nurse do it once the doctor write down the condition of the patient.

The third issue is less about waiting time but more about convenience for the patient, clinic and insurance company. Depending on the clinic/ hospital there could be certain situation where they do not accept Medicare or the insurance company that the patient is associated with. This troublesome encounter could both waste the time and money of the clinic/ hospital, patient and the insurance company.

Waiting time is a universal problem for many countries around the world. There isn't a single way to resolve the issue of waiting time since there are many contributors that causes it.

## Patient trust and communication with doctors

The importance of trust and understanding in the relationship between patients and doctors has been widely studied, and while there are many psychologically complex components to trust (Coulter, 2002), a sense of trust for their physicians leads to higher likelihood of follow-up, reduced investigation or second opinions, and less in healthcare costs. (Gopichandran, 2019) Similarly, a clear communication between doctors and their patients is crucial for successful treatment, compliance from patients and return to good health. (Cordella, 2004) Patients are highly vulnerable on quality care from their doctors, with their wellbeing being highly reliant on the ability of doctors to not only provide the correct treatment, but also doing so in a way which develops trust and understanding as well.

Traditionally, trust has been a quality which has needed to be earned by doctors (Coulter, 2002), though one aspect of the referral process which can definitely be questioned whether it is possible for physicians to establish a strong with of trust with their patients in overloaded our overloaded medical system where consultation times are quite commonly in 15-minute timeslots (ImagineMD, 2009). While patients in the private medical system may have greater opportunity to choose between doctors and potentially longer consultation times, this is not an option for patients in the public system, especially in their choice of specialist (Healthdirect, 2020).

While no studies were found supporting widespread distrust or failure of communication with doctors in Australia, a study from South Australia interviewing patients from both public and private hospitals showed that patients in the public system often exhibited ‘resigned trust’ in their doctors, or some feeling of trust partly derived from not having other options to depend on (Ward et al., 2015). In another studying surveying Australians on trust in their doctors, average ratings for GPs have been high with a mean of 4.1, but ratings for specialists have been slightly lower at 3.8 out of 5. (Hardie & Critchley, 2008)

## Benefits of a medical diary

Ever felt confused, angry, sad, etc? Having a medical diary to write down thoughts can help can significantly improve the mood of the situation that a patient is facing.

One of the ways psychologists teach patients to manage their emotions is in the form of a medical diary where they write down how they feel like they are struggling in life. The reasons of writing a medical dairy scientific studies have shown that it can help improve anxiety of people, reduce stress, and help cope with depression of people. Furthermore, it helps the patient prioritise their problems, fears, and concern so that they can be viewed by other or by themselves. In addition, a medical diary can help track symptoms of a patients on a day-to-day basis so medical professionals can have a better understanding of the patient.

At the same time, medical diary does not necessarily apply to only psychology. According to New York Times a study shows that writing thought in a journal like a diary can improve a person’s memory and communication skills. If a person consistently writes on a journal they tend to improve on their IQ, more self-confidence and improve body immunity due to the improved in self-confidence.

# Stakeholders

The main stakeholders in this project are those whose activities may be directly affected by our solution: specifically, patients seeking treatment, patients who have had previous experiences with specialists, and the medical specialists themselves, with both types of patients being the main beneficiaries of our solution. The sections below describe the stakeholders and a plan to engage with them.

## Role definitions

The most vital stakeholders in this project are defined below:

### Patient

In this context, a patient is defined as a person who is seeking medical help. In some cases, they may be referred to medical specialists; however, this is not strictly necessary. Patients have two roles in our proposed solution: firstly, recording their experiences in the medical diary; and secondly, searching through locations, themes, and clinics for information others have posted.

### Specialist

In the scope of this project, a specialist is any medical professional who works in a specialised field (not a GP). Some specialists require referrals for appointments; others only require referrals for Medicare to cover part of the expenses; visits to some specialists may not need a referral at all. These stakeholders are not our target audience but may be affected by usage of our solution.

## Intended end users

For the proposed solution, the intended end users are the patients themselves, as they record their own experiences within the medical system to help other future patients. The users could be any person either seeking to take note of their experiences or looking to see what others have posted; however, younger users may find the system easier to use and are the main target of our solution proposal. Older users may already have preferred specialists, especially if their issue is common or chronic. One thing which may be beneficial would be considering accessibility issues in the implementation of the solution, in order to expand the range of possible future users and to make it as easy as possible for the users to benefit from its existence.

## Stakeholder identification

Table 1 describes stakeholders and their interests.

|  |  |  |  |
| --- | --- | --- | --- |
| Stakeholder | Power | Interest | Needs/wants |
| Patients | High | High | Finding a suitable specialist  Recording their experiences within the medical system |
| Specialists | Low | High | Acquiring patients |
| GPs | Low | High | Helping patients find a suitable specialist |
| Australian Health Practitioner Regulation Agency (AHPRA) | High | Low | Ensuring the rules and regulations are being followed by both GPs and specialists |
| Medical Board of Australia | High | Low |

Table 1: Stakeholder identification

## Benefits for other stakeholders

### GPs and their role in handling referrals

Our proposed solution aims to increase the amount of power patients have in which specific specialists they are referred to. When patients are better equipped to make informed decisions, GPs should be able to take these requests into account, which may benefit their relationship with their patients, in addition to helping them acquire more patients through recommendations from people who have had a good experience with them.

### Government/regulatory boards

With regulatory boards’ investment in the general health and safety of the population and keeping their own stakeholders satisfied, it should be beneficial to them that patients are able to make better decisions based on the information stored by our solution. If people can see the experiences of others, it will make it easier to decide which specialists are right for them, enhancing the overall satisfaction of the populace.

## Engagement plan

Table 2 describes proposed methods of communicating with the stakeholders outlined above, along with their position on Mendelow’s power-interest matrix.

|  |  |  |  |
| --- | --- | --- | --- |
| Stakeholder | Engagement | Channel | Frequency |
| Patients | Manage closely | Software notifications | As necessary – when updates happen (impossible to reach all potential users unless they already have access to the solution) |
| Investors | Manage closely | Email updates  Budget meetings  Progress/timeline meetings | Weekly |
| Specialists | Keep informed | Software notifications  Email updates  Community news | As necessary – when updates happen |
| GPs | Keep informed | Email updates  Community news | As necessary – when updates happen |
| AHPRA | Keep satisfied | Email updates  Community news  Check-in meetings | As necessary – when regulations change |
| Medical Board of Australia | Keep satisfied |

Table 2: Stakeholder engagement plan

# Studies

## Initial survey and results

Our team conducted surveys on ordinary people and specialists and got their feedback on the appointment of specialists. Details on the survey questions asked and raw data collected may be seen in Appendix A. 26 people participated in our general survey. Through investigation we learned that seeing specialists is a relatively common occurrence. According to the results, not many people have issues with their specialists, indicating that either the participants did not care about the specialist or the quality of the services received was good. Since only a small portion of the candidates believed they might not get good quality service from the specialist and most participants had no regrets about seeing specialists, our solution may be unnecessary.

For the specialist survey, we surveyed 4 specialists. All four specialists agree that a software system that allows patients to choose from a list of professional medical staff will enhance patient-to-patient care. Furthermore, all 4 specialists are willing to sign up for the service, because they believe that patients have a difficult time finding a specialist that suits them.

## Interim interviews

For this iteration of the solution development process, our team conducted interviews on members of our potential stakeholder groups: namely, GPs, specialists, and people who may find themselves needing to see a specialist. The questions asked in the interviews are listed in section 0 of this report, along with the affinity diagram in section 11.4.

The original intention was to conduct 5 interviews for each stakeholder group; however, due to issues with access to the right people, we ended up with responses from 3 patients, 4 GPs, 1 specialist, and 1 nurse, all spread across the three countries.

The most significant themes uncovered in the interviews were those of time limitations, the complexity of the insurance systems and patients’ issues, and open communication between stakeholders. The main takeaways from the interviews are shown in Table 3 below:

|  |  |
| --- | --- |
| Theme | Conclusions |
| Time limitations | * The referral process and getting treatment can take a long time, which can be a major issue for patients with urgent or chronic conditions |
| Complexity | * Insurance systems vary between countries and can be difficult to navigate * Appointment and referral systems vary between hospitals/clinics * Medicare only comes into place when a referral has been made |
| Communication | * GPs tend to refer specialists they already know and work with * Some clinics have their own directory of preferred specialists * Patients generally trust the opinions of their GPs and their choice of specialist * Patients having knowledge of what sort of specialist they would need to see for their issue could speed up the referral process in certain contexts |

Table 3: Interview results from the second stage of the project

## Final interviews

Following a recommendation from teaching staff to improve on both our problem and solution spaces, we conducted more interviews targeted towards patients, focussing on past experiences and issues that they have encountered. Based on a thematic analysis of the interviews, it appeared that the main concerns patients had with their experiences were related to trust and communication within the medical system. Table 4 highlights the main points mentioned under the three most common themes:

|  |  |
| --- | --- |
| Theme | Conclusions |
| Trust/communication | * Good communication skills are vital but often lacking between GPs, their patients, and specialists * Information is not always shared between the relevant parties * Patients are not informed of their options when it comes to requesting being referred to a specific specialist |
| Flaws in the medical system | * Information about what services are covered by Medicare is not always shared with the patients * When it comes to mental health, it is important to find a specialist that can work well with the patient, but there is no way to organise short meetings to get a feel for things * Many services depend on having a regular family doctor |
| Competence | * Significant disparities between various medical professionals’ levels of knowledge and diligence when treating patients |

Table 4: Interview results from the third stage of the project

## Solutions discussed

Based on further research as well as stakeholders’ feedback from surveys and interviews, the team has come up with several new solution ideas in this iteration, which solve more detailed aspects of the problem space than the previous solution. The team finally discussed and selected one of these solutions as the decided solution.

### Waiting times

* A system to aggregate available times for specialists that patients can find information about who is available soonest for any particular specialist, so that patients can show this information to their GP to be referred to faster treatment.
* A system that allows users to find clinic that never have to wait for a doctor.

### Uncertainty about which specialists to see

* An anonymous, moderated Q&A platform for medical question that people can gather information from others and get their experiences of seeing a specialist.
* A helpdesk style service with settle-in health professionals for quick answers, that help people with their unsure medical problems, such as the corresponding kind of specialist with patient’s symptom.
* An automated recommendation tools that patient can search their symptom and to be paired with a list of specialists.

### Chronic or urgent conditions

* A medicine delivery for people who have chronic and need special medicine or need medicine urgently with sending their medical record to the pharmacy.

## Previous wireframes

### Wireframe of the first iteration: making appointment

Graphical user interface

Description automatically generated

*Figure 6: Wireframe of the original system: making appointment*

### Wireframe of the second iteration: searching specialist

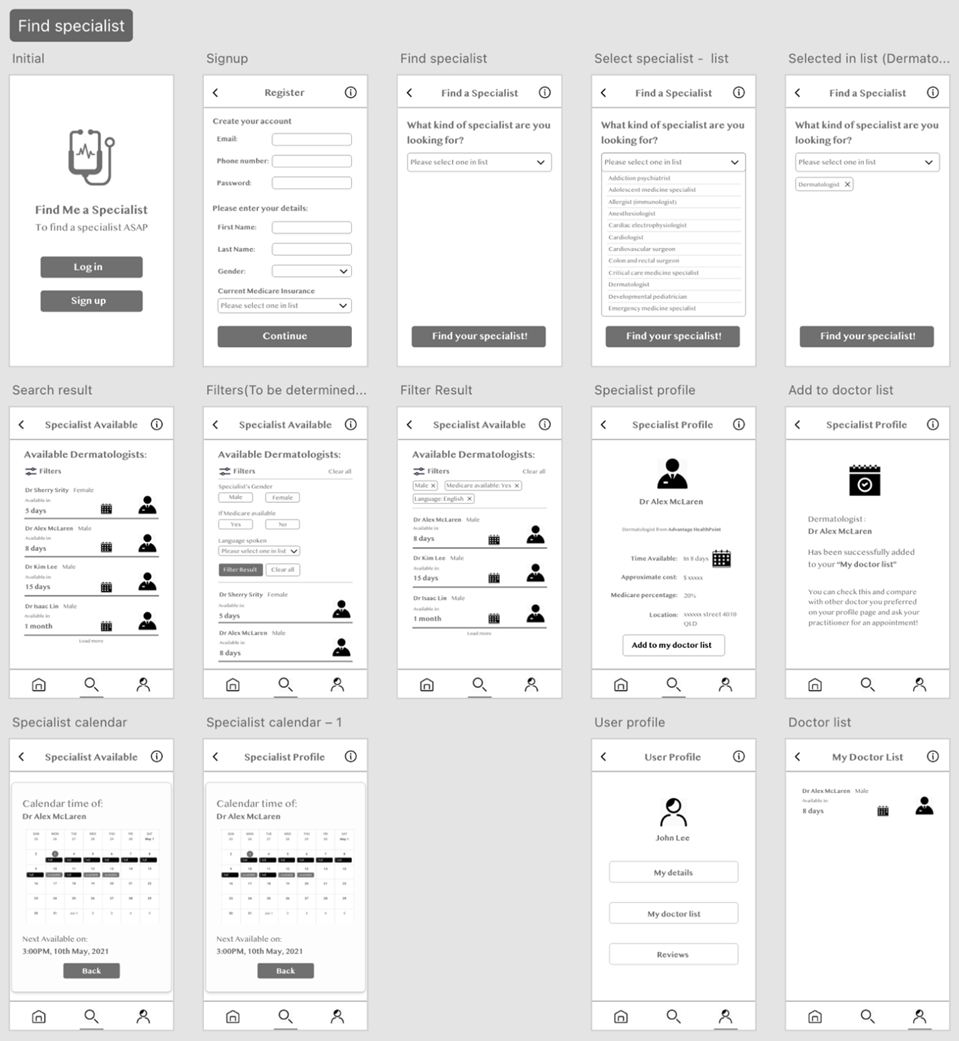


Figure 7: Wireframe of the previous system: searching specialist

# Solution Idea

## Idea generation

### Online referral system

#### Regarding waiting time

Base on the interview and research we’ve done, we discovered one of the most significant issue happen in the referral process was the patients would not be able to find our which specialists were available at the time. Because the process was done by the GPs. Thus, we introduce the sub-system in our prototype to solve this problem.

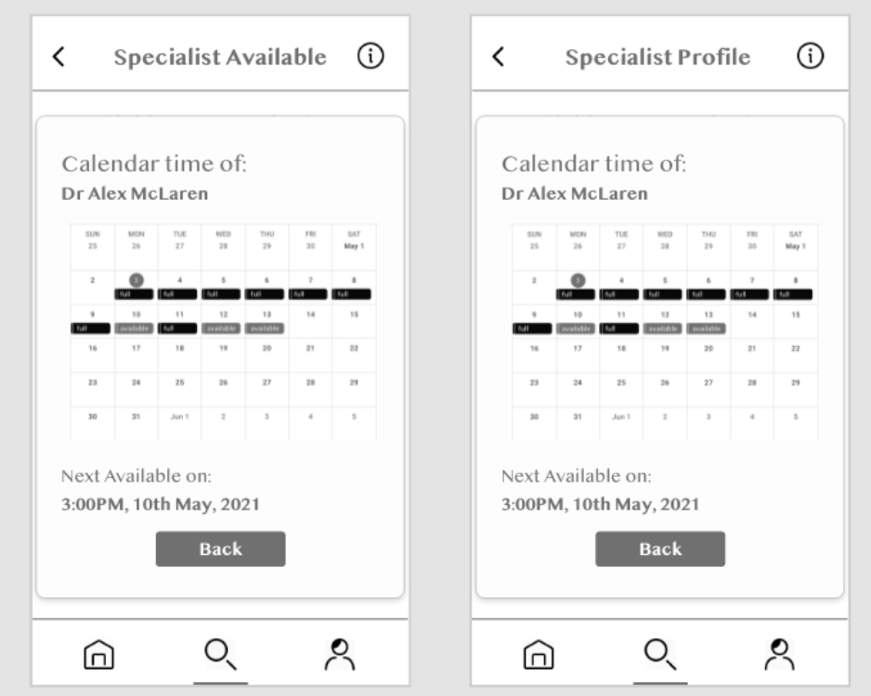


Figure 8: Solution idea of waiting time

#### Regarding uncertainty about which specialists to see

It came across a special case when we did our interview. Patient sometimes doesn’t know what their symptoms are. They might just know a very basic perspectives such as back pain, headache etc... So, we should establish a sub-system which could allow patient to input their symptoms, and then the system will automatically recommend the most suitable specialist for them.

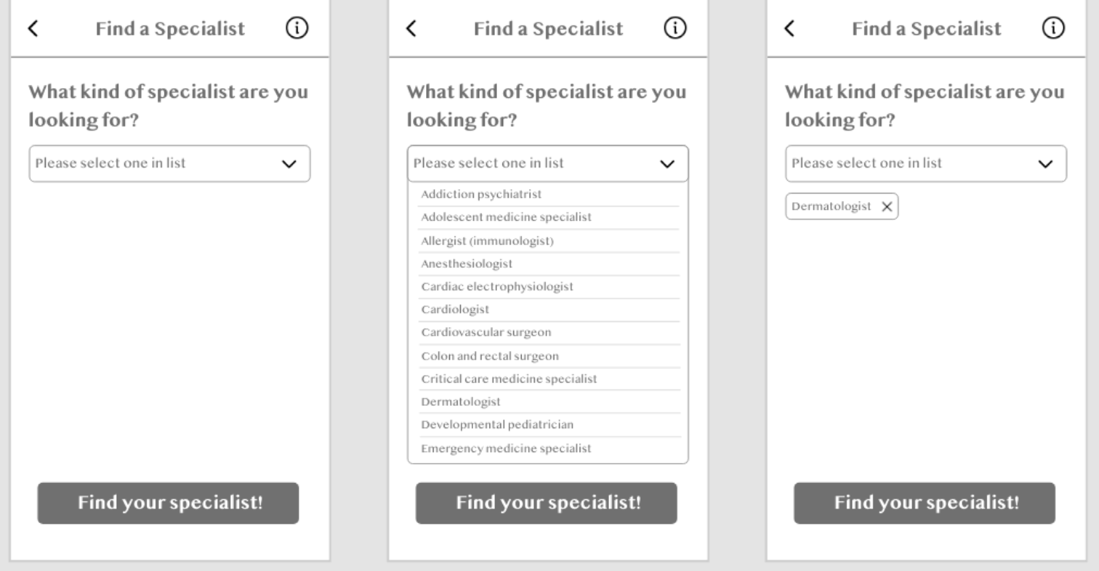


Figure 9: Solution idea of searching specialist

#### Regarding chronic or urgent conditions

For the idea, we got inspired by some existing system. At the previous report, in some online platform for medical service, they also provide online pharmacy. Although it doesn’t sell any prescription. But still a good idea, because there maybe situation like some patients may urgently need for the special medicine. Thus, based on this concept, we thought it should be a good idea to add this function on our prototype. However, due to lack of support evidence on the availability of this function in Australia, we decided not to add this function onto our prototype. Until further studies being conducted.

### Medical diary

#### Regarding medical diary

In the very late stage of our project, since the outcome of the original prototype didn’t meet our expectation, we decided to build up a new system based on the previous one, the medical diary system. It allows patients to input their medical history and based on that information, the system could add the symptoms to similar list. Once the patient views the similar solution on the public section on the system, the patient can also get the direct contact method.

Graphical user interface, text, application

Description automatically generated

Figure 10: Solution idea of medical diary

### Comparison Table

|  |  |
| --- | --- |
| Solutions | Stakeholders |
| Online Referral System (Waiting time) | Patients, Specialists, GPs |
| Online Referral System (Uncertainty about which doctor to see) | Patients, Specialists, GPs |
| Online Referral System (Online pharmacy) | Patients, Specialists, GPs, Investors, AHPRA, Medical Board of Australia |
| Medical Diary | Patients, Specialists, GPs, AHPRA |

# Proposed solution

Amongst all the potential solutions we came up with, we thought that it would be most interesting if patients could anonymously share their medical experiences to assist each other. In the form of a medical diary, this could help patients remember and make decisions about their medical history, and more importantly feel more informed about their health while learning about how others might be coping with similar conditions. It is important that patients log information such as the specialists they see and treatment they take and thoughts or feelings afterwards. Patients unfamiliar with their own condition will be able to browse the anonymous medical diaries of others in their surrounding area, and thus learn about specialists or treatment they could try out. The platform should also optionally allow comments or direct messages so that patients with similar conditions can reach out to each other.

Since the problem space surrounding the specialist referral space is a complex one, we do not see the medical diary as a full solution to the issues associated with medical referral, but just an additional means to prevent patients from being ‘trapped’ if their existing GP or specialist are unhelpful.

## Key design choices

The following are some key design decisions we have made for our proposed solution. We also from now on refer to potential users of our medical diary as ‘diary writers’ and ‘uninformed patients’.

* **Medical Diary**

We have decided on the concept of a medical diary as we believe that patients going through longer lasting illnesses should be using them anyway. Diary writers should add updates to their diary whenever there are new develops in their illness whether good and bad. Over time, this log should become helpful for documenting both good and bad progression of illness, and if multiple specialists and treatments have been tried, how effective each one has been. Our background research also shows that medical diaries can have psychologically therapeutic effects for patients and can improve long term memory. The process of writing also forces users to organise their thoughts so that they have a better understanding of their current situation.

* **Searchable semantic organisation of information**This is the aspect of the proposed solution which attempts to aid the biggest issue we found with the patient referral process during our research. It is hoped that by providing a source for further information, patients can gain a stronger understanding for their condition and treatment options outside of the short consultation time they have with their GPs. The proposed solution should be able to semantically identify information such as symptoms, location and specialists written in diaries so that when searching, uninformed patients should be able to learn about patients experiencing similar illness in their area, the specialists and treatment options they pursued and resulting outcomes. Ultimately, this should all help patients feel more confident in understanding of their illness so that they can make better decisions and communicate with their doctors more effectively.
* **Anonymous sharing**

While it is crucial that uninformed patients browsing the app are able to see in depth specialist and treatment information, due to the sensitive nature of the data diary writers are contributing, all information presented by the app must be anonymous. This design decision should also be clearly communicated to diary writers in implementation, as a feeling of safety with their data is extremely important for them to feel comfortable writing down their experiences.

* **Comes in the form of a personal app**

We have deliberately chosen to have our proposed solution take the form of a mobile app so that all users feel that the medical diary is personal to them. Again, easy accessibility and feeling of security is important for diary writers to feel comfortable writing into the app.

* **Separation of diary and search interfaces**

The proposed platform should operate with two distinct ‘modes’, with these being a mode for diary writing, and a separate mode for browsing the diaries of others. We do this so that the diary interface is clean and simple, and diary writers are not distracted into browsing others’ diaries while they are writing their own.

* **Must be backed by health authorities**

With trust being a key issue in our research, it is important that the proposed solution is supported by a key health authority such as the Medical Health Board. Uninformed patients should be able to use the app without concern that the information they are reading is contributed by malicious actors, and diary writers should confidently be able to confidently write without fear that information they contribute might be linked back to them.

## Conceptual model

### Conceptual design

#### Problem statement

How can we provide patients with a natural way to document and share their medical experiences to assist each other?

#### High-level description

We provide a medical diary to allow users to keep track of their medical history. Semantic categorisation of information allows medical notes to be publicly searched and organised. Users may relate to those with similar conditions and make direct contact.

When the user clicks the See Your Story button, the user views his or her medical diary. At the top of the page is a search bar, where users can quickly find what they want to see by typing in keywords. Each medical diary displays symptoms, time and location, and users can click on each to see details. The details page allows users to view their medical history.

When the user clicks the plus button on the See Your Story page, the app jumps to the Add History page, where the user can Add a new medical diary. By entering information, symptoms, consultation, and notes and then clicking the Add button, the user can complete the Add process. It is worth noting that when users want to Add consultation, the page will jump to the page of Add Consultation, requiring users to further input information such as expert type, clinic and experience.

After the user selects Search for Symptom, the user can view the medical diary of other users by searching for Symptom. Users can access More information by clicking the "Read More" button. On the Read More page, the user can add a Comment by clicking the Comment button in the lower right corner. In addition, users can view profiles of other users by clicking on their profile pictures.

When the user selects Search for Location, the user can Search for medical diaries near that location by entering a location. Below the search box, users can add multiple locations to suit their search requirements. After selecting Search for Clinics, the user can access a medical diary by entering the name of a clinic or medical specialist. Below the search box, users can add multiple clinics or medical specialists to meet their search requirements.

#### Interaction paradigm

Mobile app which feels personal and intimate to the user

#### Interaction mode

Touch, search, reading, writing, communicating

#### Key interface metaphors

Diary: Users can view their medical diary through the interface metaphor of life diary

### Design guidelines

#### Aesthetic integrity

Aesthetic integrity indicates the degree of integration of the appearance and behaviour of an application with its functions (Themes-IOS-Human Interface Guidelines-Apple Developer, nd). The application reminds the user to enter the type of specialist they want to find through a striking search box.

#### Consistency

Improve the familiar standards and paradigms of the application by using well-known icons, standard text styles and uniform terminology (Themes-IOS-Human Interface Guidelines-Apple Developer, nd). The application always maintains a uniform text style and terminology to make the application consistent.

#### Feedback

When the user performs an operation, the system display should always provide feedback to confirm the operation and notify the user of the result (Themes-IOS-Human Interface Guidelines-Apple Developer, nd). When the user successfully adds the medical diary, the application will notify and display the detailed information of the user's diary.

#### Metaphors

When the virtual objects in the application are rooted in real-world metaphors, users can quickly learn (Themes-IOS-Human Interface Guidelines-Apple Developer, nd). Users can use the diary interface metaphor to learn how to quickly view the medical diary and better understand the content of the diary.

### System requirements

#### Simple and readily accessible search bar

Key interface needs to be obvious and easy to search.

#### Rationale

This application will be used when someone is sick and needs to view their own cases.

#### Notes

Patients may be highly stressed and anxious due to the situation, so the application interface needs to be very simple and easy to use. An overly complex interface is not conducive to alleviating the tension of the user and may make the user more nervous.

## Requirements

### Functional requirements

|  |  |
| --- | --- |
| Requirement ID | Description |
| FR1 | Login system and user database |
| FR2 | Search with different classifications |
| FR3 | Diary documentary |
| FR4 | User profile |
| FR5 | Location API |
| FR6 | Hidden content set up |
| FR7 | Specialist database |
| FR8 | Comment and reply |

Table 5: Functional requirements of the system

### Non-functional requirements

|  |  |
| --- | --- |
| Requirement ID | Description |
| NFR1 | Database security |
| NFR2 | Date and time calculation |
| NFR3 | Health authority collaboration |
| NFR4 | Back stage monitoring |

Table 6: Non-functional requirements of the system

## Prototype

Based on the change of solution from previous iteration, the wireframe is also changed and prototyped as a medium-fidelity click-through prototype in Adobe XD, so it can potentially be used to elicit feedback from stakeholders. Screenshots of this is presented below in Figure 11 and the functions are descript in section 7.6.3.

### Prototype link:

<https://xd.adobe.com/view/245404e1-1ec4-4e6f-867b-222d663ebe72-7107/>

### Overall wireframe

图形用户界面, 应用程序

描述已自动生成

Figure 11: Wireframe of the final solution: Medical diary

### Function description

#### Navigation

When the user enters the application, the application will provide the user with two options, the See your story button and the Search button. When the user clicks the See your story button, the application will jump to the user's medical diary page. When the user clicks the Search button, the application will continue to provide users with options including Search for symptom, Search for location and Search for clinics. The purpose of navigation is to provide simple and easy-to-understand words and interfaces to help users enter the desired page.

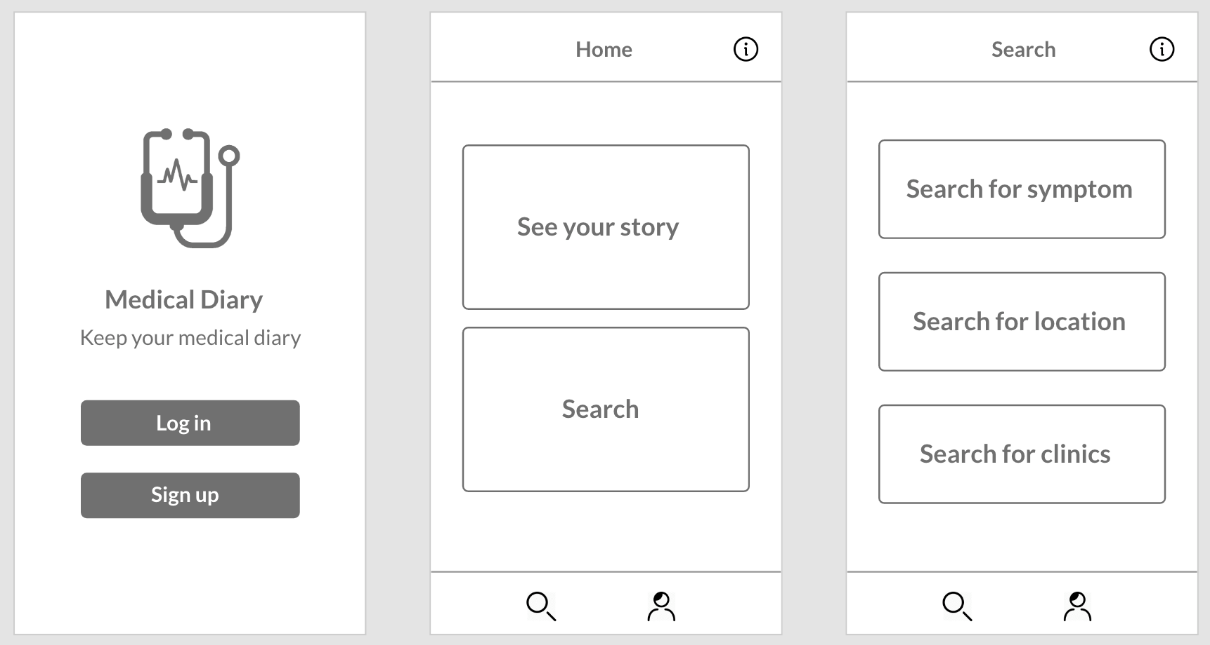


Figure 12: Navigation

#### See your story

When the user clicks the See your story button, the user checks his medical diary. There is a search bar at the top of the page, and users can quickly find what they want to view by entering keywords. Each medical diary will show symptoms, time and location. Users can click on each medical diary to view detailed information. On the detailed information page, users can view their medical history.

Graphical user interface, text, application

Description automatically generated

Figure 13: See your story

#### Add medical history

When the user clicks the plus button on the See your story page, the application will jump to the Add History page, where the user can add a new medical diary. By entering the situation, symptoms, consultation and notes and then clicking the Add button, the user can complete the adding process. It is worth noting that when the user wants to add a consultation, the page will jump to the Add Consultation page to ask the user to further enter information such as the type of expert, clinic, and experience.

Graphical user interface

Description automatically generated

Figure 14: Add medical history

#### Search for symptom

When the user selects Search for symptom, the user can search for symptom to view other users' medical diaries. Users can get more information by clicking the Read More button. On the Read More page, users can add comments by clicking the Comment button in the lower right corner. In addition, users can view the profile of other users by clicking on their avatars.

Graphical user interface, text, application

Description automatically generated

Figure 15: Search for symptom

#### Search for location

When the user selects Search for location, the user can search for medical diaries near the location by entering a location. Below the search box, users can add multiple locations to meet their search requirements.

Graphical user interface

Description automatically generated

Figure 16: Search for location

#### Search for clinics

When the user selects Search for clinics, the user can search for the medical diary by entering the name of the clinic or medical expert. Below the search box, users can add multiple clinics or medical experts to meet their search requirements.

Graphical user interface, application

Description automatically generated

Figure 17: Search for clinics

## Risks to success

The following is a table of major identified risks which could impact the success of the proposed solution.

|  |  |  |
| --- | --- | --- |
| Risk | Impact | Mitigation Strategy |
| Not enough contribution of data from users | Usage and utility of solution would be significantly impacted without users contributing to their health diaries. | To build up a database of useful data, it may be useful to start by seeking paid participants from hospitals. Outreach could also be done to communities for various conditions to advertise how the app could provide a means for community members to help each other. |
| Poor quality of data, dangerous medical advice | It would be a danger to public health for malicious intent or dangerous information to publish into public diaries that other patients might act on. | Ideally, support from the Medical Board of Australia will allow a team of health professionals to be put together for moderation. Content which is potentially dangerous may then be filtered out from search results. Obvious forms of dangerous information such as alternative medicines and medical scams should be automatically flagged for moderation. |
| Backlash from doctors and specialists | Reputation and image of the solution could be damaged by medical professionals who have a negative opinion of it. | Support from Medical Board of Australia or some kind of health authority would help this significantly. Successful implementation of the proposed solution would mean that doctors would be more likely incentivised to communicate more effectively with their patients. |
| Patients publishing personally identifiably information | Although the intent of the solution idea is to be anonymous, users may accidentally post sensitive information about themselves while revealing identifiable data which can be misused by malicious actors. | In technical implementation, the solution should prevent patients from publishing information such as names, address, ID or exact location. |
| Solution leads to further distrust in doctors and specialists | A platform for patients to ‘share notes may further increase the identified communication divide between patients and health professionals. It would be dangerous for a patient to ignore important medical advice thinking that they ‘know better’. | Patients using the app should be reminded that advice and recommendations from doctors and specialists should always be taken seriously. Ultimately, all medical action and treatment should happen through the medical system and it is important that health professionals ensure the safety of their patients just as they do now. |
| Security breaches leaking sensitive medical information | Sensitive personal data may fall into the hands of malicious actors. | All technical measures should be taken to ensure security of data stored. Data should also be uploaded anonymously so that a widespread data leak cannot expose medical diaries along with associated personal data. |

## Further factors of consideration

### Organisational

The solution is a medical based system, so it needs medical organisations’ support to make the system work and ensure users’ trust. In this case we should try to get collaborate with the medical organisations as much as we can in order to gather specialists and clinics information, as well as getting support on backstage monitoring of users speaking to shield incorrect information from malicious actors.

### Situational

The solution is that when the user appears on the scene, he finds the case through the application, or the case that the surrounding users can understand. From these cases, the users can tell whether they have similar symptoms before, and how to treat them if they have the conditions at that time. In order to ensure that users can use our solution in the solution in this scenario, we need a match between the real world and the system.

### Cultural

The cultural aspect is also a worthy part of our prototype, because Australia has many residents and tourists from all over the world. Therefore, it is worth considering to provide users with multiple language options including English, Chinese, Arabic and Spanish.

### Ethical issues and measures taken

When users are communicating with other users, there may be ethical problems of disharmonious comments. In order to solve this problem, we will check the user's wording and speech in real time to ensure a harmonious comment atmosphere.

## Success criteria

The ultimate goal of the solution is to provide users with a medical diary so that users can track their medical history. The semantic classification of information allows public search and organization of medical records. Users can contact users with similar conditions and directly contact them.

## Proposed evaluation process

We will conduct further user testing to ensure that our application meets the needs of users and provides users with corresponding assistance. We can evaluate the application interface and interaction methods by performing heuristic evaluation. Then use the design walkthrough evaluation method to evaluate whether the application meets user expectations.

# Questions and areas of investigation

This section covers remaining questions that we have on the problem space and proposed solution which should be explored given more time on the project. For each question, some detail is provided on our understanding thus far and any further research activities that may be undertaken to gain a deeper understanding. We note that some questions have been removed from the previous iteration of this report as remaining questions about prior prototypes are no longer relevant. The original copy of this section will however be included as part of our supplementary material.

For the build team implementing this ambitious project, it is recommended that further research be done on these remaining questions that we have.

## Question for the problem space

#### Is what we have already a 'solved problem'?

From our evolved understanding of the problem space, it appears that improvements to the specialist referral process need to much deeper than additional directories for finding contact details to medical specialists. Patients with complex conditions are often in situations where they are given costly referrals to specialists do not provide the care which they are hoping for. Due weaknesses in communication with GPs, patients can have trouble understanding what their condition even is and the options available for treatment. Without being more informed, vulnerable patients may not even know that trying multiple specialists may be an option. And therefore, the medical information sharing could be a good way to break patients’ knowledge block and gather more information.

#### Why aren't systems like HealthShare more well-known?

Patients may sometimes be confused about the treatment and specialists who could help them the most, and not know how to look for a different specialist. A platform presenting specialists available in the local area may not be as helpful as initially believed, as a strong understanding of the condition is required to figure out the type of specialist to look for and why. For GPs operating under tight time constraints rushing through many consultations per day, use of a platform like HealthShare during consultation and discussion with patients weighing up the pros and cons of all available options is not realistic. GPs we interviewed were also heavily incentivised to refer specialists in their own personal network, and were distrusting of HealthShare like services.

#### What is left for us to do in this problem space?

This problem space is open to innovative solutions that can help patients improve their experience if they have not been provided sufficient explanation from the GP on the nature of their condition, or have been referred to a specialist but, due to lack of experience, cannot determine whether treatment is not as effective as it could be. The proposed solution somewhat circumvents GPs and tries to introduce an additional source of information for patients that can be looked at outside of consultation times, but other solutions may exist which involve GPs and specialists more proactively.

## Question for the proposed solution

#### How will it be widely used under Australian medical system?

As it’s only a case sharing platform, it won’t be conflict with the Australian medical system and most Australians’ mind, and the only concerned thing for users would the authenticity and referenceability of what others say. In this case we aimed to get collaboration with medical organizations to help us checking if there are any malicious misleading information, and we might also give a designation for the cases that have been approved be the medical organization to let people know what is correct. Also, another problem is people in general usually won’t know such a system in real life. In this case, we might also get collaborate with more medical institution and clinics so that they can recommend our system to their patients.

#### How helpful will the medical diary concept be to patients?

Since the medical diary allow users to share their information and read other’s information of medical cases under classification, it could help patients who face at the same symptom to get together, where the experiencers can provide useful information to patients who are unsure about the situation, so the now patients can learn more about how to deal with symptom, what kind of specialist to find and which clinic to go from similar cases from others.

#### How might GPs and specialists perceive the platform?

Since the medical diary system is mainly designed for the patients. The GPs and specialists might be in doubt for this system at the first place. But with more and more users share their conditions and opinions onto the diary, the influence of this system will be increased. And with the increased of the influence, more and more GPs and specialists will start to join this system and share their opinions. In this case, the GPs and specialists might have a positive perspective on the platform.

#### How can we incentivise users to write medical diaries on the platform?

* We can develop achievement system.
  + Like when the user writes more opinions on the platform, he/she got a virtual reward like a badge.
* We can develop a level-up system in the platform.
  + Like when the user writes a diary on the platform, he/she will get a virtual experience. After certain experience gained, he/she will level-up. In certain level, his/her medical diaries could be viewed by more users.
* We can develop algorithm to analyse the users’ activities.
  + Like when the user writes more medical diaries on the platform, the platform will analyse he/she performances. If it is a good user, the platform will put his diaries on top of the platform and notify and congratulate the user.

#### How will we protect users’ private medical history?

For users who don’t wants to show their medical history to others, we have made a choice of hidden the cases for each story, so that the users can choose what to show others and what is only for personal recording as a diary. For the hidden cases, there is a securely protected database to keep all users' information safe. In this case, it will be fully compliant towards those that want to keep their privacy and will follow existing medical laws.

# Project Plan

The following section describes the progress of the project throughout the semester, and outlines risks which may occur during the course of the development of the solution.

## Tasks

|  |  |  |
| --- | --- | --- |
| Task | Estimated duration | Required resources |
| Background research | 2 weeks | Research materials |
| Initial surveys | 2 weeks | Willing participants |
| Conceptual model | 2 weeks | Survey responses |
| Prototype development | 2 weeks | Survey responses |
| Presentation preparation | 1 week | Background research  Survey responses  Conceptual model  Prototype |
| Iteration 1 | | |
| Interview design | 1 week | N/A |
| Conducting interviews | 2 weeks | Willing participants |
| Thematic analysis of interviews | 1 week | Interview responses |
| Conceptual model refinement | 2 weeks | Interview responses and analysis  Existing conceptual model |
| Prototype refinement | 1 week | Interview responses and analysis  Existing prototype |
| Presentation preparation | 1 week | Interview responses and analysis  Revised conceptual model  Refined prototype |
| Iteration 2 | | |
| Solution evaluation | 1 week | Interview responses  Existing conceptual model  Existing prototype |
| Interview design | 1 week | N/A |
| Conducting interviews | 2 weeks | Willing participants |
| Thematic analysis of interviews | 1 week | Interview responses |
| Conceptual model refinement | 2 weeks | Interview responses and analysis  Existing conceptual model |
| Prototype refinement | 2 weeks | Interview responses and analysis  Existing prototype |
| Report preparation | 1 week | Interview responses and analysis  Revised conceptual model  Refined prototype |

Table 7: Expected tasks and their estimated requirements

## Timeline

The following timeline provides a description of design iterations and tasks completed during the course of the semester.

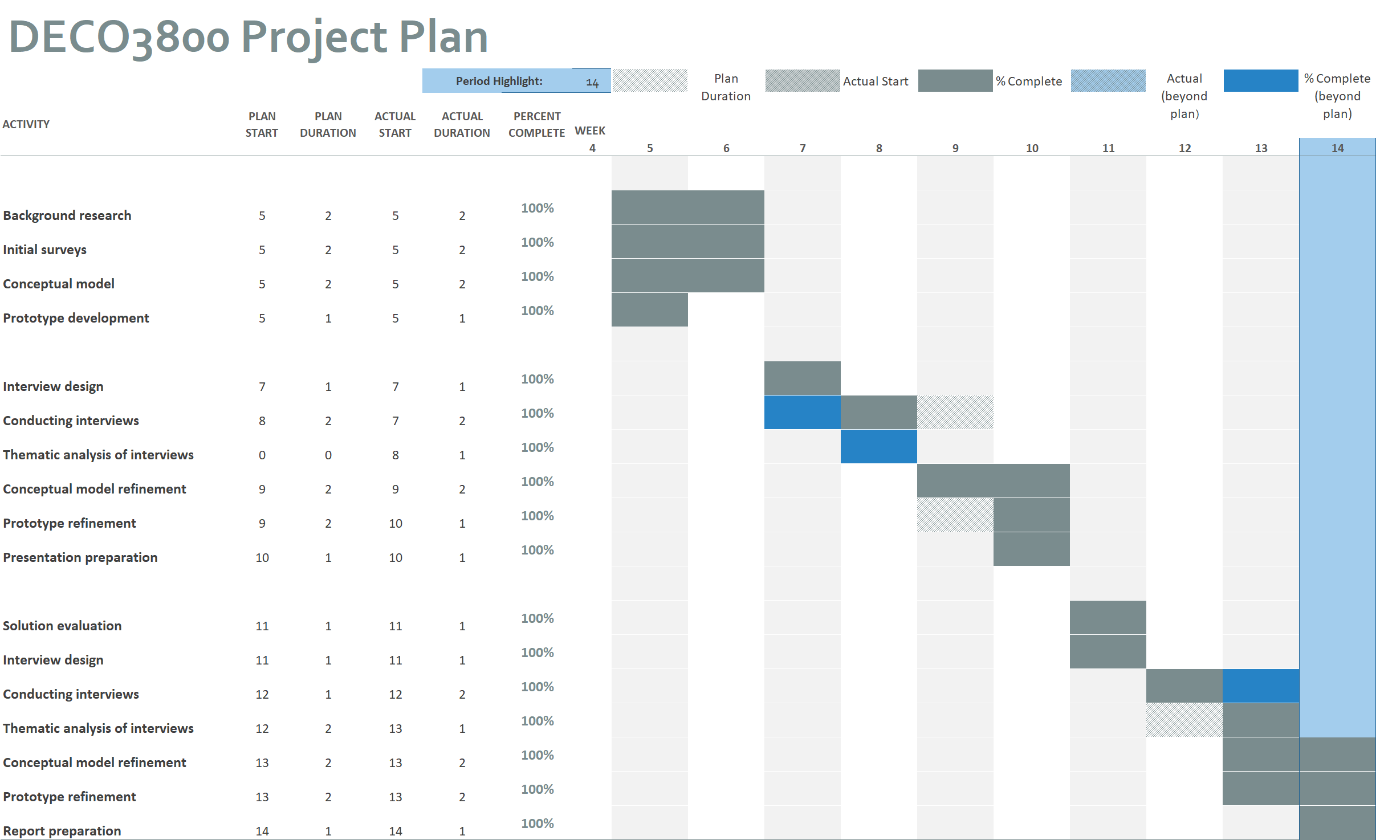


Figure 18: Gantt chart of project progress

## Risk assessment

The following three tables describe risks associated with developing the solution.

### Project

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk | Severity | Likelihood | Impact | Strategy |
| Insufficient interview data | Low | Medium | Not enough generalised data to develop next steps | Ask as many people for feedback as possible |
| No need for a solution to the problem | Medium | Medium | New ideas required to be generated | Revise project direction |
| Delays due to COVID | Medium | High | Tasks may need to be pushed back, affecting the results of our investigation | Regular team meetings  Re-evaluation of project scope, if necessary |

Table 8: Project risks

### OHS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk | Severity | Likelihood | Impact | Strategy |
| Physical injury while testing prototypes | Low | Low | Injuries of mild to medium severity | Take care when moving about  Avoid dangerous areas |

Table 9: OHS risks

### Ethics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk | Severity | Likelihood | Impact | Strategy |
| Potentially identifying data from interviewees | Medium | Medium | Breach of trust and personal data security | Remove as much identifying data as possible  Delete/destroy files after use |

Table 10: Ethical risks

# Appendix A: Waiting Time App Conceptual Model

## Conceptual design

The following is a naïve conceptual model representing our early understanding of how a solution may be formed. It should be emphasised that the design is very early stage, and that this conceptual model was developed in parallel with background research (prior to its completion). After further investigation and interviews, our team decided to change the direction of our concept design. From providing patients with comprehensive and detailed expert selection to providing patients with the fastest available expert selection, so that patients can get faster treatment.

### Problem statement

In Australia, waiting time is important for patients, but general practitioners almost always recommend people they know or trust, so general practitioners may not be able to recommend the fastest specialist.

### High-level description

The purpose of this application is to provide patients with the fastest expert selection so that patients can receive treatment faster. Users can register by providing their personal information and medical information. After registration, the user can enter the application homepage, which allows the user to select several different experts in the list.

When the user enters the type of specialist they want to find, they can see the list of experts who passed the screening according to the shortest waiting time. At the same time, the list also provides each name, picture, waiting time, organization and calendar time experts for users to easily choose. It will also include a more detailed filter for users to get the more appropriate results they need, including the gender of the expert (if Medicare is available) and the speech of the language expert. The user can view the full calendar time of the expert by clicking the calendar icon and clicking the entire row to view more information about the expert.

The expert profile page allows users to view more information about each expert. There is also a calendar icon for users to view the expert’s full calendar time in a pop-up window. When users think that the expert is suitable and want to make an appointment with their GP, they can add the expert to the "My Doctor List" by clicking the button, and then see the success message on the new page.

When a user clicks on someone’s icon, it will take them to the user’s profile page, which displays the user’s information, including their details, a list of doctors, and comments. Through the "My Doctor List" page, users can add some selected experts they think are suitable for comparison and ask their GP to make an appointment. There is also a calendar icon on the "My Doctor List" to display the available time of the expert in real-time, because the time may change all the time even if the expert is added to the list.

After clicking the calendar icon on the "Search Results" page, the "Experts" profile page or the "My Doctors" list, a window will pop up showing the expert's real-time calendar to provide timely information for users to choose.

### Interaction paradigm

Mobile: Users can find the fastest available specialist doctors at any time through their mobile phones, and they can also check appointments.

### Interaction mode

Instructing: The application will recommend the user the fastest available specialist doctor and guide the user to make appointments.

### Key interface metaphors

Calendar: Users can view the appointments of experts through the real-time calendar to provide timely information for users to choose.

## Design guidelines

### Aesthetic integrity

Aesthetic integrity indicates the degree of integration of the appearance and behaviour of an application with its functions (*Themes - IOS - Human Interface Guidelines - Apple Developer*, n.d.). The application reminds the user to enter the type of specialist they want to find through a striking search box.

### Consistency

Improve the familiar standards and paradigms of the application by using well-known icons, standard text styles and uniform terminology (*Themes - IOS - Human Interface Guidelines - Apple Developer*, n.d.). The application always maintains a uniform text style and terminology to make the application consistent.

### Feedback

When the user is performing an operation, the system should always give feedback to confirm the action and display the result to keep the user informed (*Themes - IOS - Human Interface Guidelines - Apple Developer*, n.d.). When the user's appointment is successful, the application will inform the user and display the detailed information of the appointment.

### Metaphors

Users can learn faster when the virtual objects in the application are rooted in real-world metaphors (*Themes - IOS - Human Interface Guidelines - Apple Developer*, n.d.). Users can use calendar metaphors to learn how to view appointment times faster and better understand appointment information.

## System requirements

### Simple and readily accessible search bar

Key interface needs to be obvious and easy to search.

### Rationale

This application will be used when someone is sick and needs help from a specialist.

### Notes

Patients may be highly nervous and anxious due to their situation, so the application interface needs to be very simple and easy to use. An overly complex interface is not conducive to alleviating the tension of the user and may make the user more stressed.

# Appendix B: Initial survey results

## General Survey (26 Participants)

Direct Survey Link:

<https://docs.google.com/forms/d/1cxvAprQ5ku03lywx_R-cTX1mdNAEOkGsp5UPDXEu1z8/edit#responses>

1. **Have you or your family ever seen a health care specialist before? (Psychiatrist, Ophthalmologist, Surgeon, Physiotherapist, etc) (26 responses)**

Chart, pie chart

Description automatically generated

According to the survey we know more than half of our participants have seen a specialist before so we know that seeing a specialist can be quite a common occurrence.

1. **Which Country are you from? (10 responses)**

Chart, pie chart

Description automatically generated

With limited number of responses, we cannot show generalization from our diagram.

1. **How long did it take you to get your appointment with the specialist? (14 responses)**

Chart, pie chart

Description automatically generated

1. **If you have been referred to see the specialist by a GP, did you have any doubts or second thoughts on who you were getting referred to? (14 responses)**

Chart, pie chart

Description automatically generated

According to the results we can clearly see that not many people have issues with their specialist, this indicates that the participants mainly did not care about the specialist or the service of the specialist is good. Based on the result, our system might not be viable since only a small portion of the candidates think they might not get good quality service from the specialist. On the other hand, we have only a small group of respondents so no accurate data can be derived from this survey.

1. **If you said 'Yes' to the question before, what were your reasons why? (1 response)**

Background pattern

Description automatically generated

According to the response, no accurate data can be concluded with limited data.

1. **Have you ever, after having seen a health care specialist, regretted going to see them? (14 responses)**

Chart, pie chart

Description automatically generated

According to the results given most participants doesn’t regret seeing the specialist. However surprisingly almost half of the participants are on the fence or have regretted seeing the participants. This indicates that there might be a demographic of people who are willing to choose another specialist for their next visit.

1. **If you said 'Yes' or 'Maybe' to the question before, what were your reasons why?**

Graphical user interface, text, application, email

Description automatically generated

Those participants that said ‘Yes’ or ‘Maybe’ main concern about the specialist are mainly about trust issues, time and money of each session when seeing a specialist.

1. **Thinking about your experience(s) finding or being referred to health care specialists, in what ways do you think the experience could be improved? Were there any frustrations that you had with the process?**

Chart, bar chart

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

### Specialist Survey (4 Participants)

1. **What kind of Health Care Professional are you?**

Graphical user interface

Description automatically generated with medium confidence

1. **Which country do you currently reside to practice health care system?**

Chart, pie chart

Description automatically generated

1. **What do you think of the doctor referral system in your country?**

Graphical user interface, text, application, email

Description automatically generated

1. **Do you think a software system that allows patients to select a list of healthcare professionals will enhance patient-cantered care?**

Chart, bubble chart

Description automatically generated

1. **Do you think that patients have a difficult time finding a specialist that they like or are good?**

Chart, bubble chart

Description automatically generated

1. **Do you think a review/ star system would be good for patients to know how well the clinic/hospital experience is?**

Chart, pie chart

Description automatically generated

1. **Will you sign up to this service?**

Chart, bubble chart

Description automatically generated

1. **Are there any problems do you think our system will have?**

Graphical user interface, text, application

Description automatically generated

# Appendix C: Interim interviews

## Interview protocol

* **Try a little bit of context around our project.** Don’t give too much detail. Just say we are working on improving the patient referral process, but we need to talk to experts to understand the situation.
* **What happens when a referral is made?** (Ask the question differently depending on what the person does.)
  + Ask follow-up questions related to potential issues in the process
  + Are specialist referrals specific to the particular specialist?
* **What factors influence a patient/GP’s choice of specialist?**
  + How do you think a specialist is chosen by the GP? How does the GP found out about the specialist?
  + Do you think that an optimal referral is generally made?
* **What do you think of these existing solutions?** (Demonstrate each one individually)
  + 企鹅医生, HealthShare, National Health Services Directory
  + Have you/would you use them? Why and why not?
  + Would you trust a referral from a digital system? What about doctors that don’t as many people to refer
* **What happens to patient’s health records during the referral?**   
  (Question just for GP and specialists)
* **Should electronic health record impact be considered during the referral process?**

(Q&A for GPs, compare to traditional paper record)

* **How do insurance and [country]’s health system affect the referral process and patients’ choices?**
  + Price, need for referral in order for Medicare/etc to come into place
  + Quality/professionalism of specialist?
  + Limiting options?

## Affinity diagram

Table

Description automatically generated13. Appendix D: Interim Interview Policy

1. When was the last time you were asked to see a specialist?
2. Were there any frustrations that you had with the experience overall?
3. How do you think these frustrations could be improved on?
4. Looking at doctors and specialists that were involved in the process, to what degree did you trust them? Why or why not?
5. Again, looking at the doctors and specialists that you talked to in the process, how well did they help you understand your condition? Do you feel like you were well informed? Why or why not?
6. Do you think there's any way this referral process could be improved?

# 14 Appendix E: Interim Prototypes

15.1 Specialist and GP Interviews

**Interview 1 (Malaysia)**

20 min Interview

* **What happens when a referral is made?** (Ask the question differently depending on what the person does.)
  + Usually write a brief letter about the page so that the patient can give it to the specialist to analyse.
* **What factors influence a patient/GP’s choice of specialist?**
  + In Malaysia, people are not required to see a specialist without a GP so they can have their own choice on who to see
  + If you visit a GP the GP will highly recommend a specialist that is part of their association
* **What do you think of these existing solutions?** (Demonstrate each one individually)
  + There is a system in Malaysia which allow specialist to register to be a certified Specialist. But the system does not help with the communication and connection between the patient and the Specialist.
* **What happens to patient’s health records during the referral?**   
  **(Question just for GP and specialists)**
  + Most clinics in Malaysia store the health records in private clinics/ hospitals, no common health record will be stored so any specialist/ GP can access it. However, insurance companies encourage clinics and hospitals to move patient health records to be digital. (Potential Problem in Malaysia)
* **Should electronic health record impact be considered during the referral process?**

Currently, such systems are not common.

* **How do insurance and [country]’s health system affect the referral process and patients’ choices?**
  + When visiting a GP or a Specialist usually the insurance, your company will likely cover the cost of the visit to the doctor. But it depends on the company/ insurance company whether they are associated with certain medical facilities.

**Interview 2, 3, 4 (China)**

Interviewee 1: (GP)

Shaohua Mo (Doctor from hospital 从化中心医院, retired)

Interviewee 2: (GP)

Shaojun Chen (Doctor from 南方医院，retired)

Interviewee 3: (Specialist, on training)

Yiqiao Zhu (On training psychologist, friend from gym)

Try a little bit of context around our project. Don’t give too much detail. Just say we are working on improving the patient referral process, but we need to talk to experts to understand the situation.

1. **“The early stage of the referral system that we used was basic script on paper (very early), and then coming to the next stage, internal system with internal network. Then the most continence stage where everyone could make appointment with the doctor online. But I have to point out one thing, that no matter on what stage, patient need to wait on queue. Which might be faired, but some patients don’t have very seriously bad situation but on ahead of the queue, might be a terrible situation for patients who have a bad situation on behind of the queue.” (Main meaning when I talk to the first interviewee, I change a bit so it seems more reasonable)**
2. **The second interviewee doesn’t answer this question (maybe I forgot to ask). But he give briefly introduction on the referral system on the hospital I previous mentioned. I will put those under the next question.**
3. **The third interviewee provided suggestion/opinion on the project.**

**“I worked as trainee in a hospital in Guangzhou (don’t know the exact saying in English, kind of like a special ward in hospital). So as far as I see, normal referral procedure is when a patient (accompany or not) come to the hospital, he/she will go to the front counter to enquiry, then the front counter will direct he/she to the specific ward like medical ward, or the special ward that she worked in. Then the doctors (GPs I believe) will base on the situation of the patient and decide whether he needs to see the specialist or just need some prescriptions. And this part of procedure is some time waste a lot of time. I suggest you develop a program that could shorten the time of this procedure. For example, let the patient decide whether they need to see the specialist or not.” (In her suggestion I think it might be confused, but then again, I thought the price different from see a specialist and see a doctor might be the reason why she suggest that)**

* What happens when a referral is made? (Ask the question differently depending on what the person does.)
  + Ask follow-up questions related to potential issues in the process
  + Are specialist referrals specific to the particular specialist?

1. **The first interviewee said the similar point of view on how the referral is made to the second interviewee.**
2. **“The normal referral is made base on different situation. For example, the emergency section doesn’t need to be referred if the patient knows exactly what they are suffered from, such as injury, or infected. In another ward, such as medical ward, the patient won’t need to refer either. Because in some hospital such as the one I was working in, the doctors in medical ward are good enough to determine how serious of the patient’s situation, so they could just directly issue the prescription to the patient. For the patient that has very bad situation, for example, injury that might cause the patient need to do operation and stay at hospital, the doctor might just introduce/tell (noted that this is not proper referral) the patient to emergency and deal with the injury first, then come to the prescription. And to the proper referral procedure, it is normally happening when you know there are a very good specialist in the hospital who could fix your situation, then you go to the hospital and ask for that specific specialist, and then the hospital will issue the script (electronically or paper) for you, then you bring your health record and see that specialist. That was the proper referral procedure. For example, like Nanshan Zhong, the patient needs to know the time and location of the hospital that he works in, then the patient need go to that hospital and ask for see him, then the hospital will arrange, that is the proper procedure of referral.” The pic is help you understand.**



1. The third interviewee adds on a point that I think it might help with the question. It is that when a referral is made in a hospital. They normally will refer the patient to the same hospital since the sickness might not wait for the patient to change the hospital. Other than that, if the patient’s sickness is not emergency, the doctor in that hospital might suggest the patient to look for outer specialist if the hospital is not good enough (or there are other cases, like I encounter the doctor was friend with the patient and outsource specialist, then the doctor just directly told that patient to go to that outsource specialist since they are friend).

* What do you think of these existing solutions? (Demonstrate each one individually)
  + 企鹅医生, HealthShare, National Health Services Directory
  + Have you/would you use them? Why and why not?
  + Would you trust a referral from a digital system? What about doctors that don’t as many people to refer

1. **The first interviewee doesn’t encounter any of this solution.**
2. **The second interviewee doesn’t encounter any of this solution.**
3. **The third interviewee encounter one of this solution.**

**In the third interviewee scenario, psychologist sometimes need to deal with some embarrassed situation (like mental problem with sexual? I think). So, most of patient she observed was come to see the doctors via online appointment making system. She is not sure if the penguin doc had this function or not, but she is pretty sure there are online platform for that.**

* What happens to patient’s health records during the referral?   
  (Question just for GP and specialists)

1. **The first interviewee has the similar answer to the second interviewee. I will put both of their answer here. “So, when I worked at the hospital, at the early stage, the health records of the patient were hand written on a notebook, and keep it by the patients. Every time when the patient come to the hospital, they will bring this so the doctors and the specialists could keep on track of the patients. I believe we still use this kind of method for our health record recently. But I heard some subordinate said in the hospital, when the patient first come and see the doctors and specialists, they will need to enter their personal information on the computer system of the hospital, such as ID, health history and etc... So, when the patient come in next time, they can just simply enter their ID and the required information, then the doctors or specialists will have your health record on their computers. Then base on your health record, they can do a lot of things, such as suggest the patient to do some scanning, recommend the patient to other ward or doctors if they need and etc...” So, they said.**



1. **Same as previous mentioned.**
2. **Comes to the health record, the third interviewee has other opinions. “In the specialist opinion, the health record doesn’t really matter during the referral. Let’s say she is a psychologist specialist, mental health is a long-term sickness, so it might be of some use on the health record. But let’s say she is a specialist from emergency ward, for operation, then the health record would have less impact on the referral procedure. For example, all the specialist on the emergency ward needs to know about the patient is basic information, such as blood type and if they have other sickness needed to be paid attention to such as heart problem. But then again, with or without this health record, the patient had been referred to you” (Hope you guys understand what I mean, I couldn’t translate the exact meaning of what she told me due to too much technical term).**

* Should electronic health record impact be considered during the referral process?

(Q&A for GPs, compare to traditional paper record)

**1 & 2. The first and second interviewees are both agree. “It would be a lot easier for the doctors to store the health records. For example, when a patient needs to stay at the hospital for further checking, especially for the elders who owned at least two to three paper health records. Because during the period of their staying, the health record is kept by the doctor or the specialist. If there are multiple patients that need to stay at hospital at the same time, the storing of the paper health records would be a nightmare. Electronic health record would be better for storing.”**

1. **(Can’t figure out how to change to 3.) The third interviewee had no comment on this question. She is on training specialist.**

* How do insurance and [country]’s health system affect the referral process and patients’ choices?
  + Price, need for referral in order for Medicare/etc to come into place
  + Quality/professionalism of specialist?
  + Limiting options?

**Overall, the interviewees don’t seem to know much about the insurance policy. Since according to them, in China, patient is most likely having health insurance if they work in a standard company. And the company will pay small amount of money from your regular monthly salary to the insurance card monthly, then you can use that insurance card to see doctor if you suffer injury from work. They only know you can use your insurance card for seeing a doctor or a specialist or get prescription from the standard hospital. But they are not sure how they are forbidden to use the insurance card; the only thing is some famous specialists have higher price than others, so if the patient go and see them, they might have to pay extra fees beside the insurance. (Get diagnosis counts a charge, get prescription counts a charge etc... And base on your company policy, you can only pay ratio of the charge by using the insurance)**

**(I strongly suggest that we should not touch the nation wild insurance in China. I used to have health insurance before I came to Australia because I worked full time CDP at Mandarin Oriental, Guangzhou. According to my understanding, if you leave a company, you might still get deposit to your insurance card for a period from the gov, but mine was stop for some reason since I am in Australia, that’s the point, my mother’s still got deposit monthly even though she is retired for a long time.)**

**Interview 5, 6 (China / Australia)**

-- an Australian-Chinese nurse practitioner who familiar with Australian medical system

1 . **What happens when a referral is made?**

- you usually need to wait for a few days for the referral to take place, depends on symptom

What if visit a specialist without a referral?

- Many specialists will still see you but some might not.

- Patients referred from GPs usually have priority though

- Medicare won't cover any costs without a referral.

Who can make a referral?

- not only general practitioners can make a referral, but also health professionals including nurses and midwives, as well as specialists like physiotherapists, osteopath, dentists, psychologists, etc.

Are practitioner referrals specific to the particular specialist?

- Many GPs have specialist with collaboration and priorities their collaborators but it's not mandatory

- specify to be referred to a specific non-collaborated specialist is difficult; it usually takes a long time to wait

2 .**What factors influence a GP’s choice of specialist?**

- the fields of medicine and level of symptom of patient

- specialists from collaborated hospitals and clinics

- professionalism of new specialist based on previous information

- location and bilingual requirement by patient

How does the GP find out about the specialist?

- by fields of medicine

- from collaborated hospitals and clinics

- through the Australian medical system

- using National Health Services Directory

Do you think that an optimal referral is generally made?

- an 'optimal referral' is depended on different requirements of patient, it's hard to say if a specialist specified by the patient is better than a collaborator

3.**What do you think of these existing solutions?** Have you/would you use them? Why and why not?

(企鹅医生, HealthShare, National Health Services Directory)

- helps both patients and practitioners

- I know there are apps like 企鹅医生 and HealthShare in China but haven’t use one of them

- I’m happy to use one that can connect patients and doctors together

- have an idea of a chatroom between practitioners, specialists and patient

- the Information partnership of National Health Services Directory allows practitioners to find quality specialists

4.**Should electronic health record impact be considered during the referral process** (compare to traditional paper record)?

- the hand-written health record is usually hard to read (because of medical abbreviations and writing style)

- the electronic health record can be printed as a paper record for patient

What happens to patient’s health records during the referral?

- the electronic health records will be transferred by system to protect patient's privacy.

- practitioners and specialists have responsibility not to exposure patient's record

5.**How do insurance and Australia’s health system affect the referral process and patients’ choices?**

- patients must need a referral letter from GP to be eligible for Medicare rebates

- the Medicare Rebate system allowing patient only 5 ‘Allied Health’ visits per year, which may limit opportunities for patients to treat their “health issue” in some fields

-- a 5-year Chinese immigrant who live in Australia

1 .**What happens when a referral is made?**

- need to wait for a long time

- I once waited for 3 months for an operation

Have you visit a specialist without a referral?

- No. I think it’s troubled to book a specialist by yourself and the specialist won’t have any information from your previous doctor

Is your practitioner referred you to an acquaintance specialist?

- Yes, I think it’s more reliable when seeing someone known by practitioner. That means the specialist is profession enough to get a cooperation with my general practitioner.

2.**What factors influence your choice of specialist?**

- Price and Location

- If the specialist is known by my general practitioner

- Language speaking

Do you think that an optimal referral is generally made?

- I think my general practitioner can always help me with a good referral, not sure if it’s a “optimal” one but enough. However, it will be more “optimal” if the wafting time is shorter

3.**What do you think of these existing solutions?** Have you/would you use them? Why and why not?

(企鹅医生, HealthShare, National Health Services Directory)

- I use similar apps like 企鹅医生 when I was in China

- most cities in China have their own official app for patients to book a specialist from different hospitals, and will take priority than patients who didn't book

- I don’t even know HealthShare and National Health Services Directory, I always find a specialist from my GP in Australia

- I’m happy to try one if there is an official one in Australia because it could save time of connecting with practitioner

- worried about the price as well as the professionalism of unfamiliar specialists though

4.**Would you trust a referral from a digital system?**

- Yes.

- maybe the referral from a digital system is better because all the information can be stored in the system while the connection between people may miss some information

What about doctors that don’t as many people to refer

- maybe they are still good doctors, but I prefer doctors with more reviews

How do you think an electronic health record compared with a traditional paper record during the referral process?

- I think an electronic one is better that I can read and store it easier

- the system can protect information better than paper

- it’s troubled when forget to take a traditional paper record when seeing a doctor

**Interview 7 (Australia)**

**Referral Process Demonstration:**

- There's 2 systems, doesn't like using the new one

- There are many templates to choose from

- There's an address book to choose from, populated by the clinic

- Each specialist may have multiple addresses

- Referral letter autofill medication, allergies, past history, medicine

- Once the referral letter is written, it can digitally be sent to the specialist

- A digital key is used to send referral to the specialist

- Sometimes the secretary of the specialist will follow up on the referral.

- GP encourages patient to be more proactive

- A different template with more information is used for public system

- Public referrals are to public hospitals

- There's an option to connect to other database, but GP doesn't want to use it

- Referrals are usually for someone that you know and trust

- There's a lot of information that directory doesn't have

**What happens when a referral is made?**

Depends on private or public. If private, goes to private letters. There are multiple referrals letters that can be picked from the program, and there are also different programs that can be used.

Are referrals made specifically for particular specialists?

Yes

**Are referrals also given with a date range?**

Good for a year.

**How do you usually choose a specialist to refer? Do you usually know them?**

Go to meetings, listen to them, listen to patients' responses. They might say that they are good or they bad. "it's like everything, ear to the ground, common sense, experience". Or asking colleagues.

**Do you think that an optimal referral is generally made? (Time, cost, expertise)**

Well, you try. If you have spent enough time, then yea. You ask your colleagues. You have to know whether the patient can afford the specialist.

If they there isn't any where to point them towards you can try to start by referring to people that might be able to help? You know who has connections, who can push them along in the public system.

Referring is a bit of a tricky business. In December when everyone is on holiday you can't find any doctors.

When the patient can't book the specialist, you just give them another name and then another name...

Do you have any personal frustrations with how referrals are made by GPs in Queensland/Australia?

Doesn't like the smart referrals system, too many questions. "They" always want more data, more tests, etc...

It's the government???

**What do you think of HealthShare?**

Hasn't seen it before. Basically, doesn't think it's very useful because there isn't enough detail, and because it's not a referral of a proper GP. You don't know how old or experienced they are. "This is a bit blind."

If a patient comes with me and wants this one, I've no choice but to give it to them but they are responsible for whatever happens to them.

No comment on specialists who might be 'bad'.

**What do you think of the National Health Services Directory?**

Has nothing against it because it gives people empowerment.

Wouldn't use it, don't have time.

**What do you think of Penguin Doctors?**

Doesn't use WeChat. You can see a specialist directly, but Medicare won't pay for it.

You can't go to a telephone consult with a GP that you haven't seen before.

You can do this in Australia if you want to pay the whole lot.

Medicare is are almost practically not enough to pay the doctors anyway, will be inconsequential.

**Wrap up:**

The examples shown were a good starting point. By people don't just go to a GP they are usually recommended by somebody. It doesn't matter whether it's a GP a specialist, we have the same problem, choose wisely.

One of the downsides of opinions is that opinion from one day isn't necessarily reflective of ....

# 15 Appendix F: Final Interview Policy

|  |  |
| --- | --- |
| Process | What should be done? |
| Approaches | Both unstructured and semi-structured interview. |
| Method | Arrange isolated meeting. |
| Time frame | Depends on the Interview. (Normally 1 hour to 2 hours) |
| Participants | Mostly focus on patients. (Some might have experience with specialist) |
| Environment | Relax environment, preferably in a quiet, clean room. |

The general policy on this interview session was to establish a trust between interviewers and the interviewees, and then the interviewer asks the questions. The policies are listed below:

* Provided as little information related to our project as possible.
* Only introduce our project to the interviewees briefly, such as how do they feel like if they had to wait for a long time to get their condition fixed.
* Let the interviewees think of their own answers. Such as the previous question, some interviewees might think it doesn’t matter for them, on the other hands, some might think it the other way around.
* The interviewer should guide the conversation during the interview. For example, as the previous question, some of the interviewees might have opinion that deviate the original expectation. Such as they might think that they don’t really know about this but heard someone complaint about long wait times.
* Asked the follow-up question based on the interviewees’ respond.
* In the unstructured interview approach, the interviewer should ask the follow-up question based on the respond from the interviewees. For example, as the previous question mentioned, if the interviewees think the wait time was too long, then interviewer should ask what their opinions are to solve this problem. Or in some circumstances, the interviewees might directly provide their opinions on how to solve this.
* In the semi-structured interview approach, some of the questions are pre-defined, hence, it will be a bit difficult for the interviewer to ask follow-up questions. In this case, the interviewer should follow the questions flexibility. For example, they could skip the question if that question is already been answered or the question might not be valid anymore based on the interviewees previous responds.

The important of this final interview is crucial to our report. In addition, with the knowledge gain on the interview methods, we can establish this interview into unstructured one and semi-structured one. Moreover, based on the structure of the interview, we can develop the policy for this final interview.

# 15

# Appendix G: Patient Interview Result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Wait times | Trust/communication | Medical system | Competence |
| 1 | Not too long, a few days if you look around | Quality of specialists can vary but should be fine if you have a good referring GP | - | Specialist parent critical of others in field, saying their methods are ineffective and don’t handle the root cause |
| 2 | A few days but heard complaints about long wait times | Tend to trust doctors of same gender & ethnic background more | Booking systems difficult to use  Some way to check availabilities | Trust that medical professionals know what they’re doing |
| 3 | Solid wait at a hospital, but that’s just how hospitals are | Many doctors have poor communication skills (especially about the severity and likelihood of issues)  GPs may focus on tangential comments rather than the main issue | Many services depend on having a regular family doctor (and access to full medical history) | Confident in medical professionals’ ability |
| 4 | - | Trust regular GP  Hard to open up to new specialists  Quality of specialist can be iffy – can make somewhat informed decisions but a lot of it is luck | Would like to choose a more comfortable-to-be-with specialist  Would be nice to do a short meeting to get acquainted with the specialist  Aggregated reviews?  (Reasoning, demographics, etc.) | GP has understanding of referral process and what the patient should do but didn’t have knowledge of precise details of illness due to lack of specialising |
| 5 | 20min wait time in clinic  2 weeks for booking | New psych very open and trustworthy  Old psych was out of touch, gave generic advice  Medicinally conservative  (same referring GP)  Trusts GP, probably didn’t personally know psych | Not informed of possibilities in the case of not vibing with the specialist | Old psych not very helpful, didn’t know what she was doing, kept giving the same lectures |
| 6 | Ultrasound appointment for a month later  Multiple weeks for second referral  Longer waiting list for brain scan due to pandemic | Referral was a note and no info on what to do with it  Very little communication between GP and endocrinologist  No consistent medical record  No advice given for brain scan  Patient did not feel listened to or taken seriously  GP did not explain implications/meaning of illnesses | Hundreds of dollars for a sonographer and endocrinologist to analyse ultrasound  Covered by Medicare in the case of recurring headaches; not mentioned by original GP | GP only did blood tests after 6 months after exhausting all other options  GP did not document symptoms correctly  Endocrinologist discussed symptoms, not sure what the issue was |

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