

JANUARY 2023

MONASH HEALTHCARE INNOVATION SUMMER SCHOLARSHIPS

Project Embrace



Monash Partners
Academic Health Science Centre



**MONASH
YOUNG
MEDTECH
INNOVATORS**

Current Team: Sue Liu
Clinical Champion: Dr Lucy Gately
Affiliations Alfred Health

Executive Summary

It is estimated that 101 Victorians are diagnosed with cancer every day, with a total of 36,974 Victorians receiving a diagnosis in 2021. This is projected to increase due to the ageing Victorian population. Fortunately, advances in diagnosis and treatment have allowed for improved survival rates, resulting in a growing population of cancer survivors (1).

Chemotherapy is commonly used as part of standard treatment for cancer. It functions by managing the pathophysiology of cancer through inhibiting cell proliferation and therefore tumour multiplication, thereby avoiding invasion and metastasis. Consequently, this impacts the function of normal body tissue, with common side effects including nausea, vomiting and hair loss (2). There are numerous safety measures that must be taken when caring for someone receiving chemotherapy, particularly regarding the safe removal of cytotoxic waste, contaminated body fluids and the safe storage of chemotherapy drugs.

The impact of chemotherapy on patients and caregivers is well-documented in the literature (3), due to the need to cope with a potentially life-threatening diagnosis and adjustments in roles, lifestyles and patterns of living. A shift towards outpatient treatment has resulted in family members and carers becoming increasingly responsible for the management of symptoms and side effects at home. Yet, unmet information needs remain an ongoing gap in cancer care. There is an abundance of information available online, however this is typically generalised in nature. Reported issues with unmet information needs include which symptoms to monitor and report, recommended physical activity, and how to improve symptoms (4). Project Embrace's aim is to create a platform to sufficiently deliver chemotherapy-related information to cancer patients and carers of all backgrounds receiving treatment to meet these information needs.

Acceptance Criteria



The solution results in a 50% increase in **patient confidence** in undergoing chemotherapy



The solution allows for access to **personalised** and **circumstance-specific** information



The solution allows for a 20% decrease in **time burden** on existing patient communication services such as calls to the symptom-review triage services

Gaps Analysis

A search in the literature has determined that, despite the technologically advanced era, unmet information needs remain a challenge in current cancer care (4). Patients that have questions about their treatment and health have a variety of sources of information that can be found online – this ranges from forums, frequently asked question (FAQ) pages to helplines. Whilst helpful to provide an overview, this information tends to be generalised in nature due to the need to cater information to the public. Furthermore, information may not be delivered or moderated by an accredited health professional and therefore inaccurate. Patients have demonstrated doctors and nurses as the preferred source of information, particular in managing information side effects (6).

Methods to connect with accredited health professionals include paid consultations or using a cancer-specific helpline manned by healthcare professionals. These can help with more specific advice. However, these healthcare professionals will not be familiar with the patients' treatment regime and its unique implications. Furthermore, patients will only get one perspective from the multidisciplinary team and miss out on possible insights from other members and professions (e.g. nurses). Current methods to directly contact their treating team are lacking, as teams may not have the time or money to invest in manning a dedicated communication service. Patients want high-quality information that is delivered rapidly and is personalised to their needs in order to figure out how to live with cancer.

Table 1: Analysis of existing solutions

Solution	Economic Solution	Solution Alignment	Gaps
Q&A websites eg. Quora <i>Registered members can ask questions and have it answered by members of the community.</i>	Free to participate on pre-existing Q&A websites, however if creating your own: <i>Moderators; hosting services</i>	• Specific questions can be asked • Easily accessible • Affordable for existing healthcare system and patient •	• May not be healthcare professional answering • Relies on active users to answer • Language may not be written to be easily understandable
Online forums eg. Reddit, Cancer Council Online Community <i>Registered members can ask questions and have it answered by members of the community. Some forums have HCP moderators to provide advice.</i>	Free to participate on pre-existing forums, however if creating your own: <i>Moderators; hosting services</i>	• Specific questions can be asked • Easily accessible • Affordable for existing healthcare system and patient • Depending on forum - may be healthcare professional answering •	• May not be healthcare professional answering • Relies on active users to answer • Language may not be written to be easily understandable • Forums may not be well-designed making it difficult to find specific answers
Cancer Council Hotline <i>Phone line manned by health professionals to provide emotional support or provide medical advice.</i>	Free to use pre-existing, but if creating own: <i>healthcare professionals, phone hosting services and resources</i>	• Specific questions can be asked • Answered by healthcare professional • Healthcare professionals can deliver content at varying health literacy • Easily accessible	• Overall cost to healthcare system to employ healthcare professional to answer phone • Service requires promotion for people to be aware of it • Service may not be offered in other languages

Systems Map

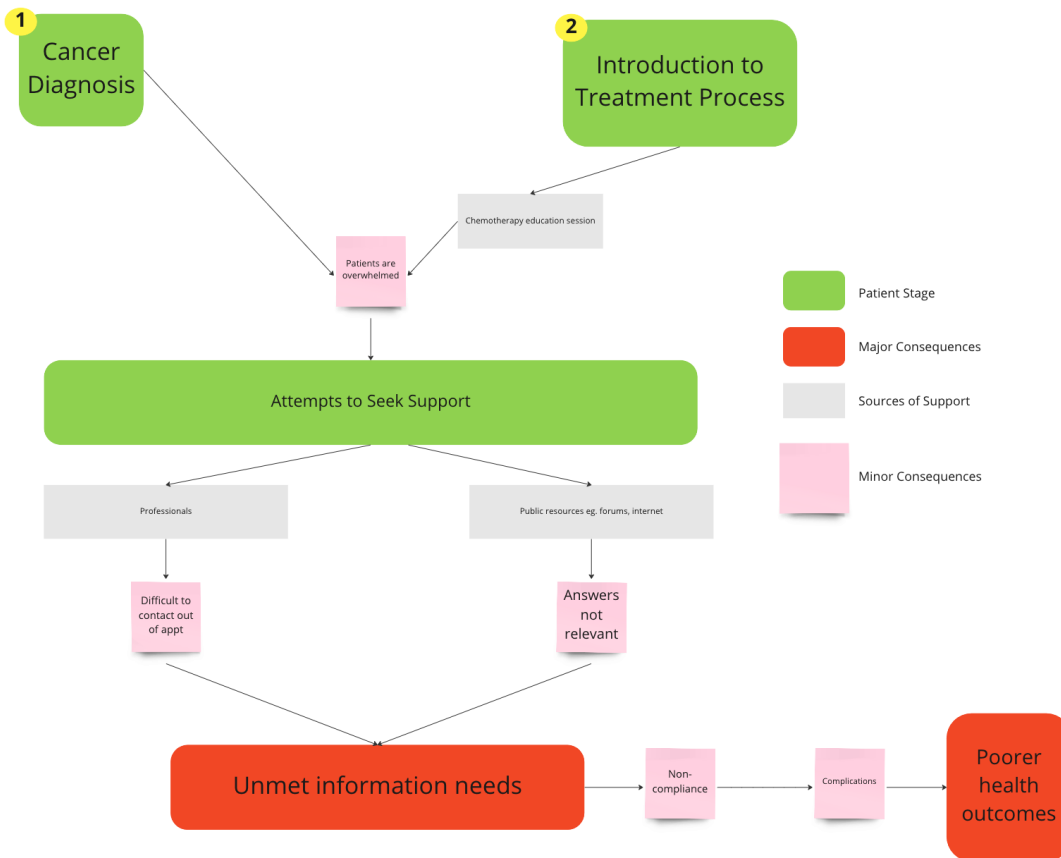


Fig 1: This systems map dictates the progression from a patient receiving a cancer diagnosis to initiating treatment. Throughout these stages, they are vulnerable to feeling overwhelmed and requiring information support. This may be sought through consulting healthcare professionals or public-facing resources including forums, however there are drawbacks to these methods resulting in unmet information needs. Not meeting information needs can be dangerous and lead to poorer health outcomes, such as cancer progression, reduced mental health and serious infections.

Link for Miro board: https://miro.com/app/board/uXjVP6yhBEI=

Stakeholder Map

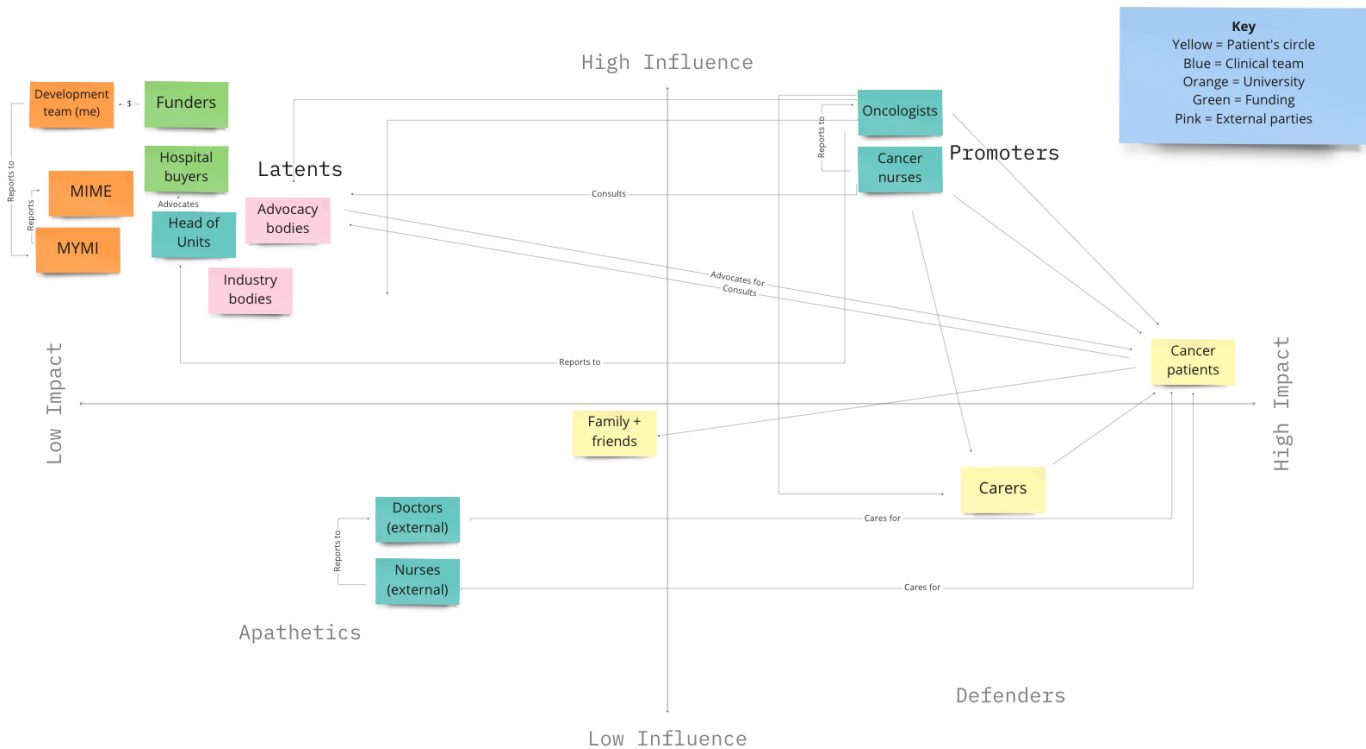


Fig 2: Depicts the range of stakeholders and the position they hold in terms of the direct influence they have on the project, and the impact the project will have on them. There are four major stakeholder categories: stakeholders who are socially involved with the patient (yellow), stakeholders on the clinical team managing the patient (blue), stakeholders relevant to the HISS (orange), stakeholders relevant to funding the solution (green) and external stakeholders (pink).

Link for Miro board: https://miro.com/app/board/uXjVP7s3Sug=

Outcomes of Qualitative and Quantitative Research

Despite the far-reaching accessibility of the Information Age, cancer patients report seeking additional health information (8). More than a third are found to be related to treatment, including side effects and risk profiles (9).

It is well known that meeting the information needs of cancer patients are beneficial. Patients who receive correct information at the right time report less anxiety about cancer and treatment, as well as improvements in quality of life, therapy adherence, psychological wellbeing, satisfaction and engagement in decision-making, daily functioning and pain management. On the other hand, unmet needs have been associated with lower satisfaction with care and worse illness perception (4).

The art of meeting information needs is not simply solved by overloading patients with information either in verbal or written formats; information processing is notably suboptimal in cancer patients due to anxiety and the impact of the condition itself (7). It is important for clinicians to give patients the chance to ask questions and the opportunity to have caregivers in attendance at all points of the care journey.

The Internet has been shown to be the second-most trusted cancer information medium (4), with rates shown to be increasing over time. There are a wide range of reputable resources online, particularly by cancer groups such as Cancer Council Victoria. However, healthcare professionals have shown limited engagement with these resources, limiting patient awareness of alternative online resources (10). Online information from other sources may be inaccurate, particularly when it is not accredited. Ideally, healthcare institutions or healthcare professionals should be involved in developing trustworthy online information sources or refer patients to existing accurate resources. In particular, patients need to be provided with a communication channel for specific questions that simply are not targeted by a generalised FAQ page.

Fig 3: Comments from stakeholders regarding the trustworthiness of online information

I've done it (consult Google) but I stopped right away because there's so much information and you don't know whether it's true or not. If anything, it makes you more scared"

Dr. Google is ... not the best method if it's the only method that you use

"Dr. Google is a dangerous thing"

Solution Concept Discussion

1

Q&A forum run by Alfred oncology team

- Patients submit questions
- Clinician responds to patient, and makes a public-facing post with answer if appropriate
- This thereby forms an ongoing database of questions and answers for others to refer back to in the future
- **Minimal production and development costs; requires ongoing clinician time**
- **Less accessible to elderly and CALD populations**
- **Restricted integration into existing workflows due to time demands**

2

Utilising question checklists

- Provide patients with a list of suggested questions to ask their healthcare professional eg. treatment protocol, side effects, self-care, safe handling
- Pre-existing question checklists have been developed by Cancer Council and eviQ
- **Minimal printing costs**
- **Healthcare professionals may not have time to answer all questions due to time constraints during appointments**
- **Patients may be overloaded with information and not retain information; information may not be delivered at the appropriate time**

3

Signposting pre-existing resources

- Provide patients with a list of resources (both online and offline) for different categories eg. how to find community groups, how to seek medical advice, lifestyle adjustments
- **Minimal printing costs**
- **Due to the generalisable nature of these resources, they may not be specific enough for the patient's needs**
- **Uncertainty about information being kept up to date by accredited sources**

Final Concept

Our proposed final solution is to create a Q&A forum website which is exclusively accessible by patients receiving care from the Alfred oncology team. This will appear in a similar format to pre-existing Q&A forum websites (Figure 4), however the exclusive access to content by Alfred patients allows for questions to be answered with consideration of the Alfred network and the Australian context.

All content produced (i.e. Q&A posts) will remain the intellectual property of Alfred Health, protecting it from being reproduced without permission.

The standard practice is for patients to ask questions during their scheduled appointments or emailing/phoning the treating team. Response times can vary for the latter method, due to healthcare professionals having other tasks of a higher priority particularly when the acuity of these questions may be uncertain. This solution will fit into the existing time currently used for these tasks. Whilst a higher time investment may initially be required, as the Q&A database increases, it becomes increasingly powerful for the following reasons:

- Patients have access to a large range of questions answered in the past
- Reduced time is needed to answer the “duplicate” questions that each patient would normally, as they are able to refer to the appropriate post

Published Q&A posts will have sensitive information removed, however there will need to be sufficient data security so that patients who initially post questions with sensitive information are protected. Furthermore, there will need to be careful review of published answers in case guidelines or the standard of practice changes in the future.

Currently, there are no direct competitors for our product. Other Q&A websites are open to the public, however this results in the answers usually being in the American context and too generalisable; consequently, patients are unable to find answers to very specific questions, relevant to their circumstances.

Fig 4: Example of pre-existing Q&A forum website, Practo

 **Frequency of mammogram** 2 months ago
Asked for Female, 50 Years

How often shall we take mammogram for breast?
Can we do & check every month if there is anything suspicious?
Or we need to do every 6 mnths
Will the size of the lump gets increased during the duration?
By Repeating mammogram will radiation cause something trouble to the body?

35 Views 

Answers (1)

 **Dr. Alok Kumar Dewangan**
Radiation Oncologist • 5 yrs exp • Raipur

Once in a year
Answered 2 months ago

Business Model

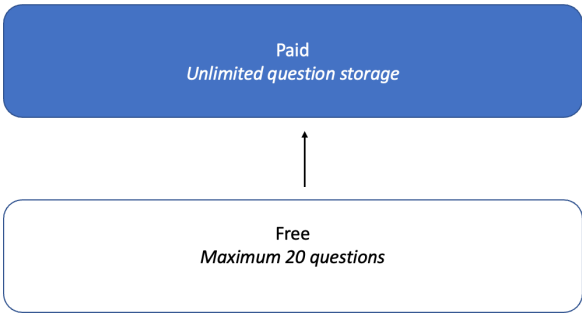


Fig 5: Proposed freemium subscription business model

The product will be available as part of a “freemium” subscription model (Figure 5), allowing hospital services to access the free tier of the product before deciding if they have sufficient patient demand and clinician commitment to purchase the paid subscription. The main difference between the two tiers is the number of Q&A posts – hospitals will be required to pay to host beyond 20 Q&A posts. Hospitals will be more incentivised to pay for the product once a sufficient knowledge database has been built, due to the perceived loss aversion, increasing benefit to patients and time savings of healthcare professionals.

For this reason, we propose offering hospitals a **6-month free trial** of the paid tier of the product to provide unlimited Q&A posts, incentivising the database to quickly become populated. At the 6 month mark, hospitals may have already surpassed the 20 question limit to return to the free tier, and be reluctant to lose this service.

There are no direct competitors offering a Q&A website, however they can be created using website design and hosting services such as Wix and WordPress. There are significant barriers to entry to this approach, as the technical nuances of such a product require expertise to produce. We are proposing a pricing of **\$20/month, \$240 annually**, to make a small profit (\$48) per unit after breaking even. This is taking into account the use of Squarespace’s website services, which we have chosen for its accessibility given the anticipated technical expertise of our team.

This cost will be borne by hospital purchasing committees on behalf of the oncology outpatient clinic services and available free of charge to patients. There are currently no appropriate MBS codes for reimbursement, however the benefits of the product are tangible, including the cost and time-savings for healthcare professionals, improved patient care and compliance with therapy. Risks to the business are outlined in Table 2.

Table 2: Risks and de-risking strategy

Risk	De-risking
Lack of patient engagement	- Consolidate initial database of questions to make it an initial reference point and inspire more questions - Promotion of the service through the staff during appointments and posters etc.
Lack of clinician engagement	- Roster specific hours for database work - Identify other possible contributors
Lack of funding	- Identify other cheaper website development/hosting services to make product more affordable - Promote to other relevant departments that may utilise the product eg. dementia - Consider changing format of product to implement relevant MBS codes eg. telehealth

Business Model

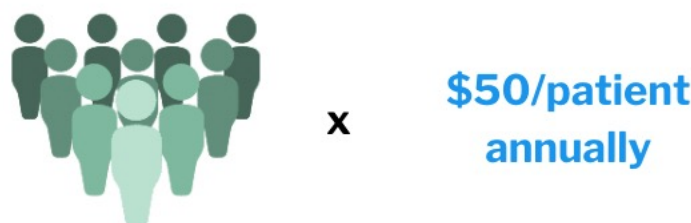


Fig 5: Proposed pay-per-user subscription business model

The product will be available as part of a pay-per-user subscription model (Figure 5), where hospitals pay a unit price for each enrolled patient per annum. Hospitals will be more incentivised to pay for the product once a sufficient knowledge database has been built, due to the perceived loss aversion, increasing benefit to patients and time savings of healthcare professionals.

We propose offering hospitals a **6-month free trial** of the paid tier of the product to provide unlimited Q&A posts, incentivising the database to quickly become populated. At the 6 month mark, hospitals may have already surpassed the 20 question limit to return to the free tier, and be reluctant to lose this service.

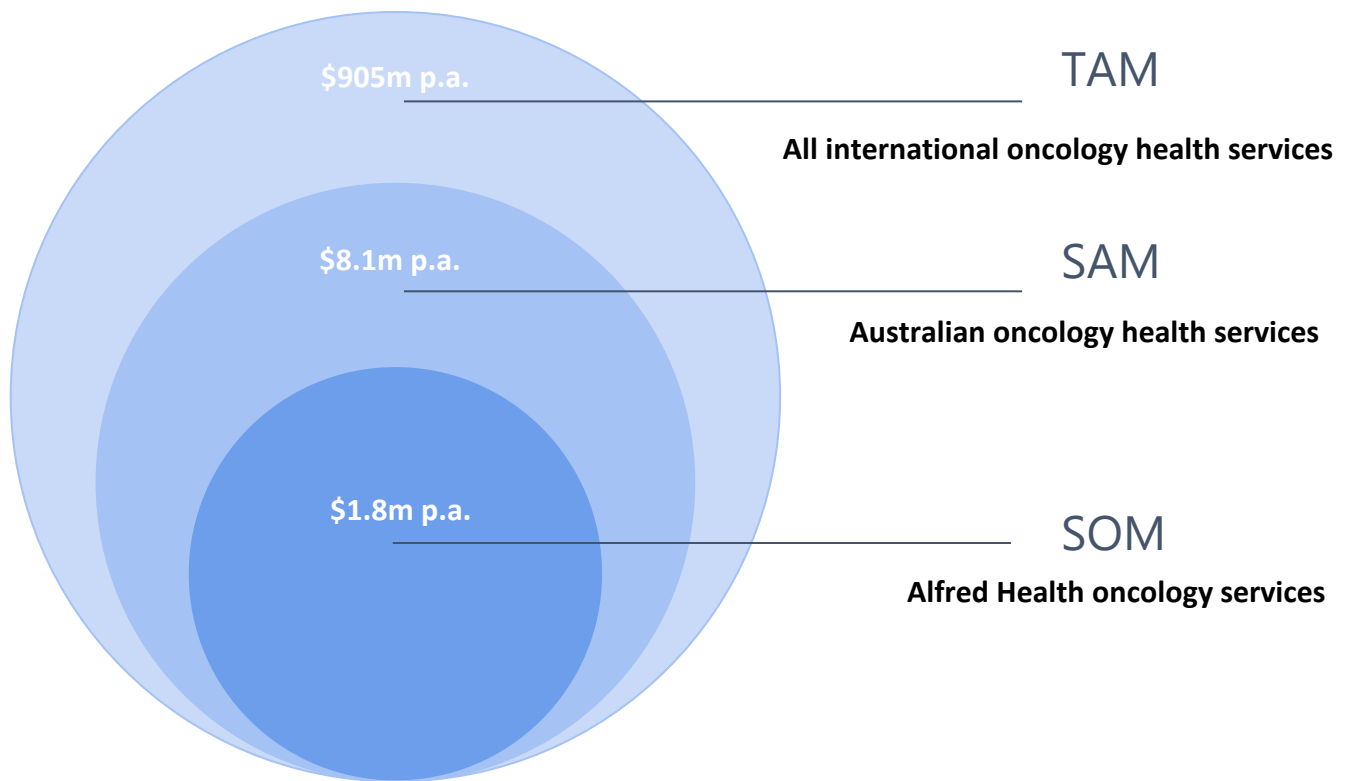
There are no direct competitors offering a Q&A website, however they can be created using website design and hosting services such as Wix and WordPress. There are significant barriers to entry to this approach, as the technical nuances of such a product require expertise to produce. We are proposing a pricing of **\$50/patient annually** enrolled to use the service.

This cost will be borne by hospital purchasing committees on behalf of the oncology outpatient clinic services and available free of charge to patients. There are currently no appropriate MBS codes for reimbursement, however the benefits of the product are tangible, including the cost and time-savings for healthcare professionals, improved patient care and compliance with therapy. Risks to the business are outlined in Table 2.

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Market Analysis



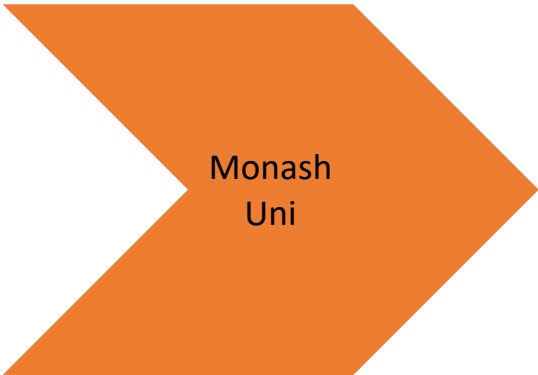
Our product specifically focuses on the clinical care segment of the oncology market, including direct treatment provision and patient experience (further segmented into patient education, advocacy and support groups).

There are no current competitors, however indirect competitors include the Cancer Council Online Community forum. Whilst the Cancer Council Online Community forum is free to access, it has limited exposure with most oncologists and patients being unaware of the resource. Furthermore, as it is public-facing, the information is often generalised in nature.

This product could be expanded into the outpatient management of chronic diseases such as dementia, where major lifestyle adjustments are required and caregivers carry a significant burden in long term care.

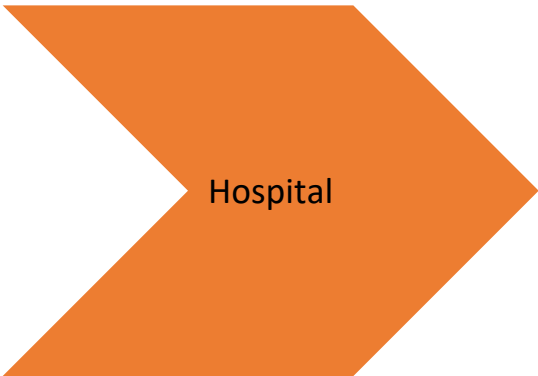
The major market forces affecting demand and funding for this product are the extent of public health funding and cancer incidence rates, which are dependent on prevalence and diagnosis rates.

Proposed KPIs



Monash
Uni

This solution fits within the Monash Partners'/MIME KPI's of cancer. This solution may be saleable to other diseases outside of cancer.



Hospital

In accordance with the Monash Health KPI's, the project is expected to have an impact on the following:

1. Unplanned hospital re-admission
2. Preventable hospitalisation for chronic disease
3. Survival rates in cancer patients
4. Toll on emergency department e.g. wait length, admissions

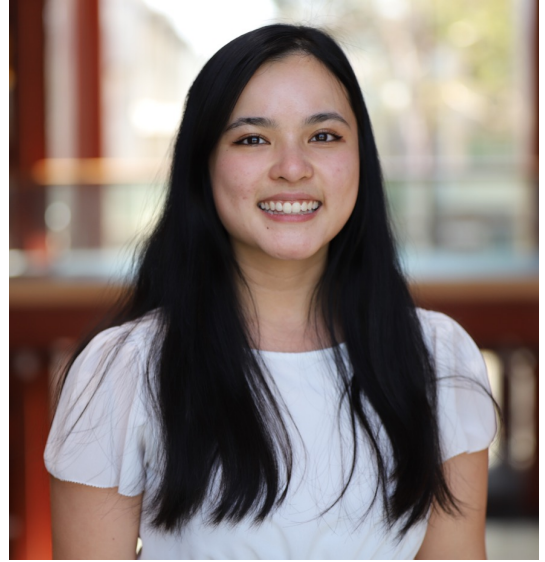
Due to the increased access to information, patients are expected to demonstrate greater compliance with treatment and increased safety, thereby reducing adverse events and improving health outcomes.

Our Team and Next Steps



Dr Lucy Gately
Clinical Champion
Medical Oncologist
PhD MBBS BSc FRACP (Oncology)
Clin Dip Pall Med

Lucy Gately is a medical oncologist with a special interest in Breast Cancer and Brain Cancer, and a strong focus on survivorship and improving quality of life during treatment and beyond. She also works with patients and their families to understand their own genetic risk for cancer, and is developing a strong research career.



Sue Liu
Project Lead
BMedSc (Hons)
BMedSc/MD Student
Monash University

Sue Liu is a fifth-year medical student with an interest in paediatrics. She developed an interest in medtech after trialling a novel continuous wireless thermometer in the clinical setting for her honours project. She hopes to bring this research experience to the project

Next Steps

We are hoping to seek initial grant funding to support the development of the initial product. Furthermore, we require personnel with software expertise, in particular familiarity with website services such as Squarespace

Timeline



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