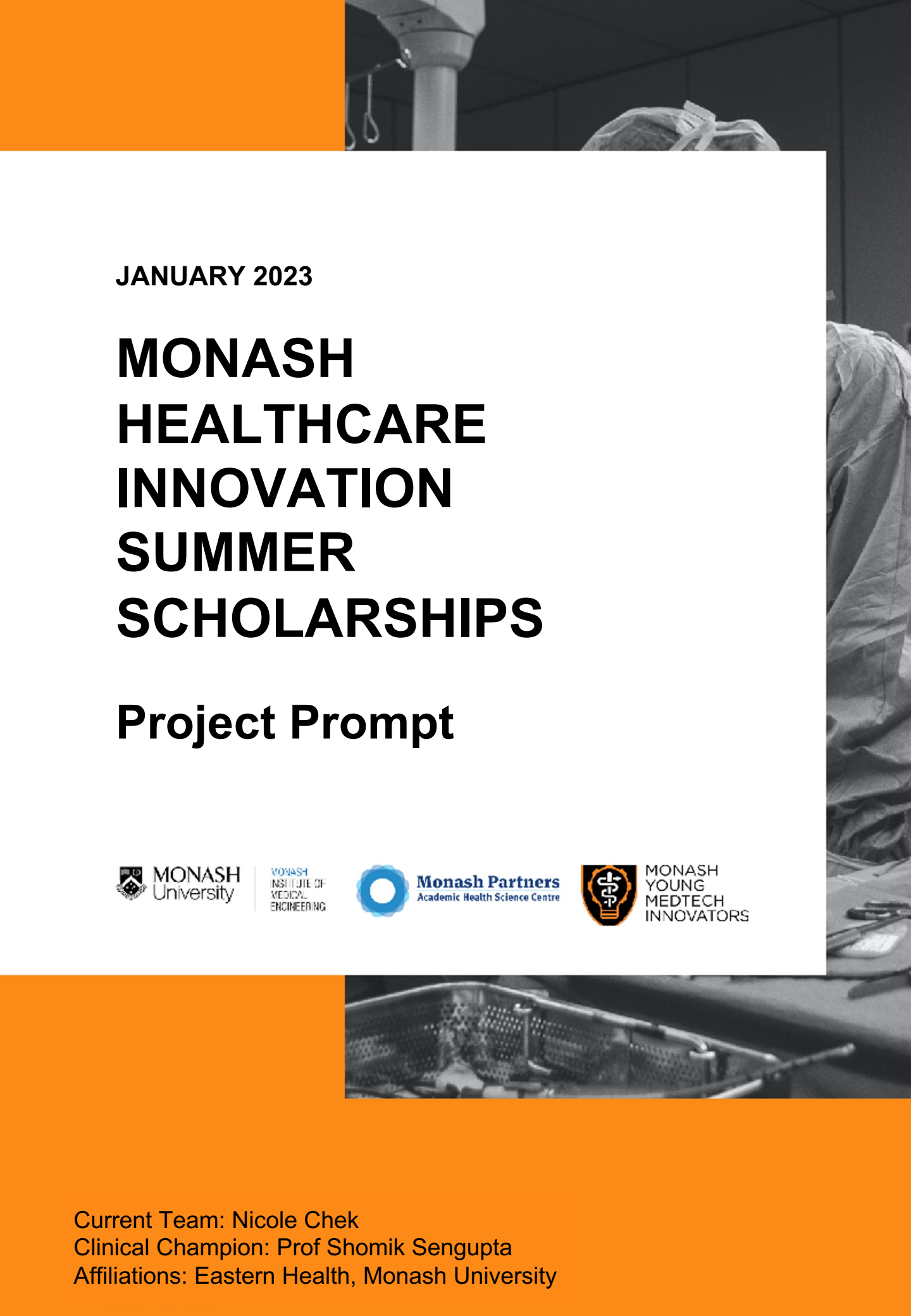




JANUARY 2023

MONASH HEALTHCARE INNOVATION SUMMER SCHOLARSHIPS

Project Prompt



Monash Partners
Academic Health Science Centre



**MONASH
YOUNG
MEDTECH
INNOVATORS**

Current Team: Nicole Chek
Clinical Champion: Prof Shomik Sengupta
Affiliations: Eastern Health, Monash University

Executive Summary

Project Prompt aims to create a solution to improve the way clinicians track non-muscle invasive bladder cancer (NMIBC) patients' treatment schedules in the hospital outpatient setting.

Patients have to undergo multiple cycles of chemotherapy after being diagnosed with bladder cancer.(1) The treatment schedule is intensive and adherence to the schedule is necessary to reduce the chance of cancer recurrence or progression.(2-3)

Currently, urology clinical nurse consultants (CNCs) create treatment schedules for each patient based on their disease states manually on an Excel spreadsheet. The spreadsheet serves as a reference for the treatment dates for all NMIBC patients.

Manually entering and tracking information in the spreadsheet is time consuming and inefficient. It is also prone to human error, resulting in patients not receiving their treatments on time. Studies have shown that missed or delayed treatments in NMIBC patients can increase the rate of cancer recurrence or progression.(2-3)

Not only that, there are gaps in communication between patients, carers and their general practitioners (GPs) as information in the spreadsheet is not available to them. Problems associated with this are currently managed by providing patients with written information on their treatment schedule on paper.

Paper templates for NMIBC treatment schedules are available.(4) However, it is used in conjunction with the spreadsheet and does not solve the inefficiencies present in the clinical workflow. There is also an online cancer care plan generator by Peter Mac that displays a generic follow-up schedule.(5) However, it does not cater for bladder cancer and the follow-up schedule is not personalised to each patient.

Thus, having an electronic tool that can generate accurate treatment schedules based on each patient's disease state will ensure a more efficient workflow and also reduce missed or delayed appointments.

Acceptance Criteria

- 40% increase in accuracy of bladder cancer treatment schedules based on patient pathology reports and treatment options
- 50% decrease in inefficiencies tracking bladder cancer patients treatment schedules
- 25% decrease in missed or delayed treatment appointments

Gaps analysis

Urology clinical nurse consultants (CNCs) use an Excel spreadsheet to manually enter and track NMIBC outpatients treatment schedules. This spreadsheet is saved in the hospital network's drive as a public file.

A spreadsheet helps CNCs track patients' treatment dates. However, this method is inefficient and time consuming as information such as future treatment dates are entered manually.

The spreadsheet used by CNCs also does not contain any formulas to help automate the process of predicting the next appointment dates based on a patient's pathology report*.

A few **issues** that can arise from using a spreadsheet include:

1. Delayed or missed appointments if CNCs missed a patient.
2. Inefficiency in modifying a patient's treatment dates if required. For example, if a patient cannot attend their appointment due to COVID and has to reschedule their appointment, clinicians have to reschedule the next few appointments manually.
3. Information in the spreadsheet or the spreadsheet itself might be modified or deleted accidentally by staff directly or indirectly involved in the patient's care.

*Pathology reports help clinicians determine NMIBC patients risk groups which will guide treatment schedules.

Gaps analysis

Solution	Solution alignment	Gaps in solution
Excel spreadsheet - Urology Clinical Nurse Consultants (CNCs) use an excel spreadsheet to manually track bladder cancer patients' treatment schedules. - This is guided based on the stage and pathological features of the bladder cancer patients.	- A spreadsheet provides the nurses a good view of a patient's past and upcoming appointments. - It is accessible to clinicians who are using devices connected to the hospital network. - It is more efficient than using paper records to track appointments.	- The spreadsheet is time consuming and tedious to work with as patient information and appointment dates are inputted manually, adding to the huge workload. - The spreadsheet is difficult to read as there is a lot of information in one sheet. - There might be missed appointments or cases where patients get lost to follow-up if relevant information has not been inputted. - Only one person can work on the spreadsheet each time as the table might get messy if too many people work on it at the same time.
Online calendar - There are many online calendars available in the market such as Google Calendar, Outlook Calendar etc. - Online calendars can be used to record patient appointment dates and time.	- Online calendars are easy for the treating team to use and track patients' appointments. - It is easy to access. - Online calendars can reduce missed or delayed appointments if the team turns on notifications for each appointment.	It can be time consuming for clinicians to manually create appointments for patients.
Cerner Oncology - This is a software by Cerner. The software allows clinicians to create and track oncology patients' treatment schedules. - Cerner is a software company that provides electronic medical records services for the hospital. - Cerner Oncology is an "add-on" that hospitals can purchase.	- This software allows clinicians to create personalised treatment schedules in a single system. - Information in Cerner Oncology is easily accessible to the treating team. - Cerner allows interoperability between Cerner oncology, electronic medical records and other services provided under the company.	Information in Cerner Oncology is not accessible by patients or GPs.

Systems Map

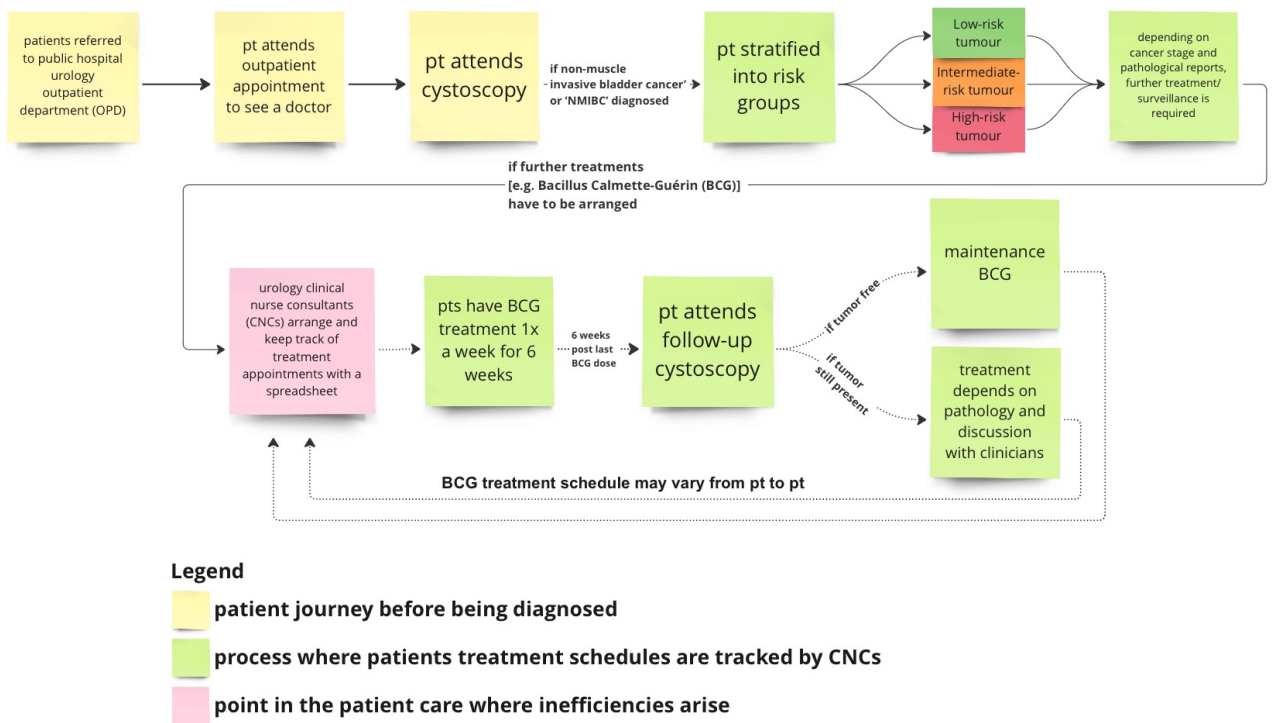


Figure 1. Systems Map

This diagram maps the patient journey from when patients attend their first appointment in the hospital's urology clinic before they are diagnosed with NMIBC until when they receive treatments.

Urology CNCs manually tracking treatment schedules on a spreadsheet is a pain point in this process as it is time consuming and inefficient. The treatment for NMIBC comprises of multiple cycles of chemotherapy. So, CNCs have to ensure the correct dates are entered to prevent patients from missing their treatments.

Link for miro board:

https://miro.com/app/board/uXjVP7JMH-Q=?share_link_id=979717733197

Stakeholder Map

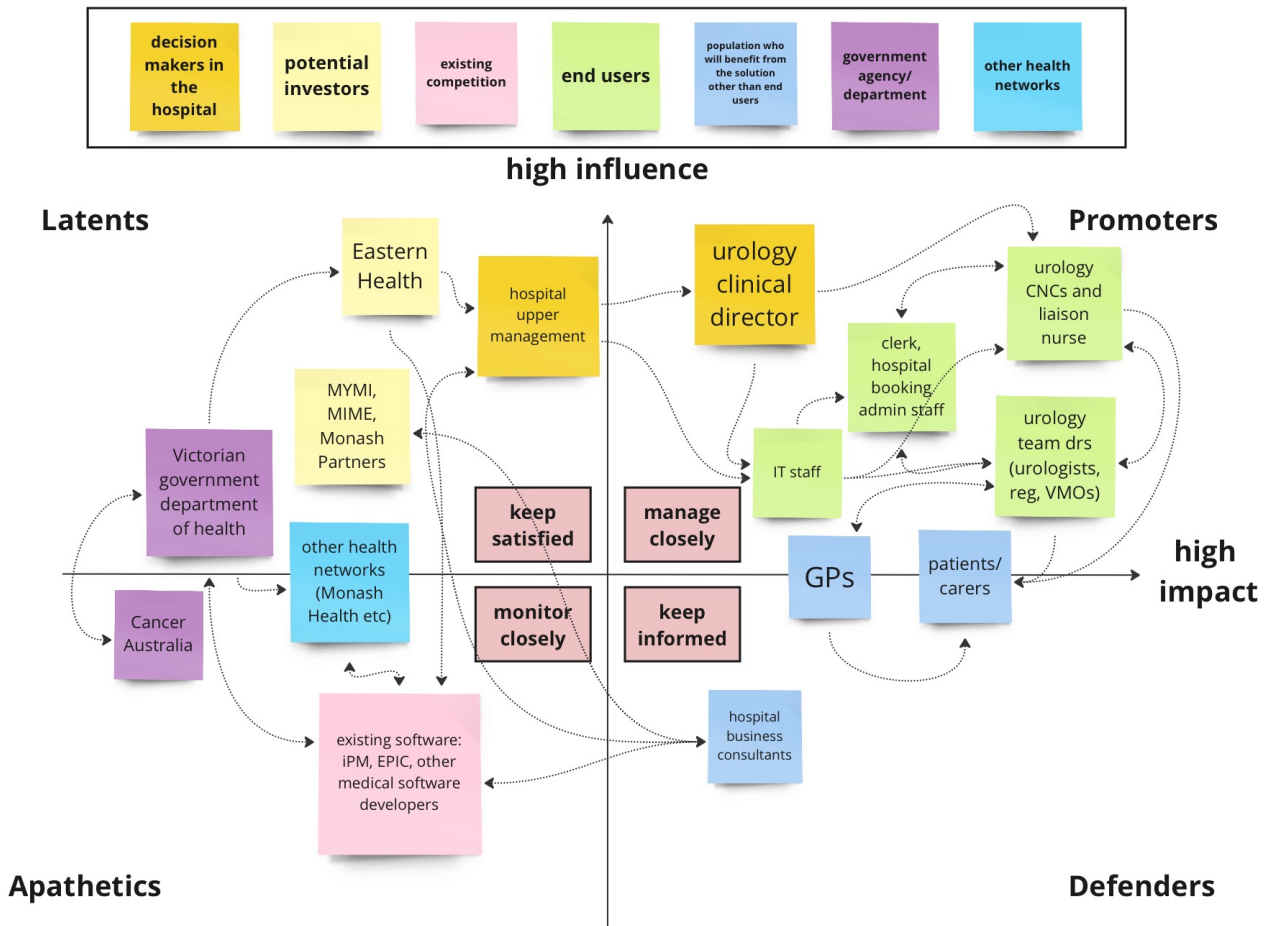


Figure 2. Stakeholder Map

Stakeholders who will directly benefit from the solution are urology nurses, doctors and patients. However, the hospital upper management and urology clinical director play a big role in ensuring the urology department has access to the tools they need to facilitate the clinical workflow.

Link for miro board:

https://miro.com/app/board/uXjVP7JMH-Q=?share_link_id=979717733197

Quantitative Research

Bladder cancer is the tenth most common cancer in the world.(6)

In Australia, 3,219 people were estimated to be newly diagnosed with bladder cancer in 2022.(7) In 2014-2018, bladder cancer patients had a 56% chance of “surviving for five years compared to their counterparts in the general Australian population”.(7)

75% bladder cancer diagnosis presents as non-muscle invasive bladder cancer (NMIBC).(2) NMIBC patients can be further risk-stratified into low, intermediate or high risk based on their pathology reports, age and gender. NMIBC will receive intravesical chemotherapy, which is an intensive treatment that requires patients to attend the hospital frequently.(1)

The recurrence rate of cancer after transurethral removal of the bladder tumour (TURB) is about 60-70%.(8) As recurrence and progression to a higher disease stage have a less favourable outcome, continuous additional testing and adherence to treatments are often needed.(9,10)

Qualitative Research

There is limited literature on the problems urology clinical nurse consultants (CNCs) face when using the spreadsheet to track bladder cancer patients' treatment schedules.

However, there is literature that discussed the need to automate administrative tasks in hospitals to reduce clinician burden and burnout as patients can fall victims to the inefficiencies in existing systems. (11)

According to a clinician interviewed, using a spreadsheet to track bladder cancer treatment schedules is prone to human error as patients can “get lost in the system”. Missed or delayed bladder cancer treatments have been showed to increase cancer recurrence or progression.(2-3)

Moreover, information on the CNC's spreadsheet is not available to patients, carers and their GPs, leaving gaps in communication between treating teams. Thus, having a tool that allows open communication between treating teams can improve care coordination (12)

Solution Concept Discussion

Proposed Solution	Pros	Cons
#1 An electronic tool that uses an algorithm to come up with specific dates of appointments after clinicians input a patient's pathology report finding. The tool should also generate an individualised plan that can be shared between the treating team, cancer patients and carers.	• Easy to use and track patients appointments • More efficient and accurate compared to current methods • Personalised cancer care plans • Reduce missed or delayed appointments • Shareable treatment plan with patients, carers and GPs	• Can be expensive to develop • Have to consider security issues
#2 Include formulas in the spreadsheet. Formulas enable the next treatment dates to be calculated and displayed automatically. This will provide the treating team a more accurate idea on when the next appointments are and can plan accordingly.	• Easy to use and track patients appointments • More efficient and accurate compared to current methods	• Other than making the process of projecting future treatment dates more efficient and accurate, this solution does not offer extra features to improve care coordination
#3 Use AI to read patients' files and come up with a complete and individualised care plan. The care plan can then be shared with patients, carers and their general practitioners.	• Easy to use and track patients appointments • More efficient and accurate compared to current methods • Personalised cancer care plans • Reduce missed or delayed appointments • Shareable treatment plan with patients, carers and GPs	• Expensive to develop • Many security issues surrounding sensitive patient information • Can be very difficult to implement as this solution requires access to most electronic systems used in the hospital

Final Concept

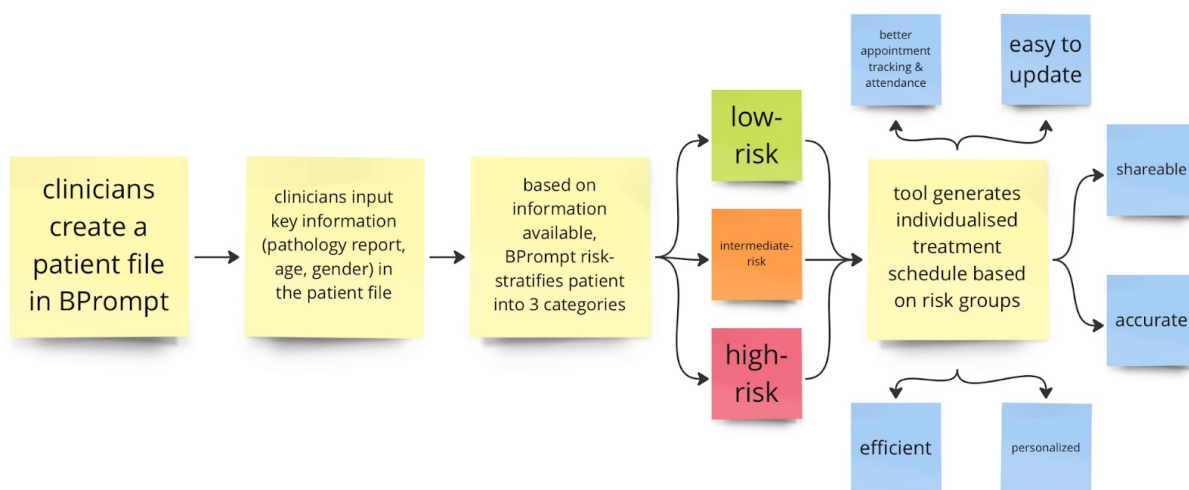
Final design: BPrompt

BPrompt is an **electronic tool** that uses an algorithm to produce a personalised treatment schedule after clinicians input a patient's pathology report finding and other key information.

BPrompt will be a web-based application to increase accessibility for healthcare providers. Patients, carers and GPs also have limited 'view-only' access to the patient's treatment plan on the website.

The tool will be integrated seamlessly in urology clinical nurse consultants (CNCs) workflow. There is no need to manually key in individual treatment dates on an Excel spreadsheet anymore as this process will be done automatically by the tool. CNCs can create "electronic patient files" on the web app. Once a treatment schedule is generated, it will be saved under the patient's file in the web app. CNCs can also modify the treatment dates and other information should there be any changes.

The process is demonstrated as follows:



BPrompt will be marketed as a tool to assist healthcare providers in making their workflow more efficient by automating mundane tasks. It is also a tool that can generate a treatment schedule that is shareable with the patients, carers and GPs. This allows patients, carers and their treating teams to have time to engage more meaningfully thus increasing the quality of care.

Technical considerations:

Patient privacy is the greatest technical risk. Thus, strong security measures must be implemented to protect sensitive data from breaches or unauthorised access.

Business Model

Business structure

A **business to business (B2B) subscription** model is suitable for BPrompt as it ensures a regular stream of income if there is a strong customer base. Customers subscribing to this service will also receive continuous support as needed.

The development of BPrompt will be initially funded by MIME. After the tool is developed, it will be sold to local health networks (i.e. Eastern Health) on a subscription model. The proposed price for this tool is \$500 annually (price will be revised).

The initial plan is to sell BPrompt to Eastern Health and other health networks in Victoria. This product will then be promoted to health networks interstate, New Zealand. And Europe as the clinical guideline used to determine bladder cancer management plan is the same as Australia.

BPrompt will be upscaled to support other cancer types in the future to expand its market.

Exit strategy

- Option 1: sell the business to another company such as Cerner
- Option 2: partnering with another company to obtain a wider customer base

Health economic profile vs Standard of Procedure

There is no direct cost benefit to the hospitals that use BPrompt. However, BPrompt will reduce urology clinical nurse consultants (CNCs) workload by offering more accurate and efficient treatment schedule tracking. This could potentially reduce indirect costs such as overtime pay for nurses to complete their work. By alleviating the CNCs workload on scheduling treatments, the CNCs time could be better utilised for other tasks at hand.

Moreover, if patients miss their appointments due to poor understanding of their treatment schedule or if they are “lost in the system” due to human error, there is a risk that their cancer might progress. If that happens, patients will require more aggressive treatments, thus increasing the cost of treatment.

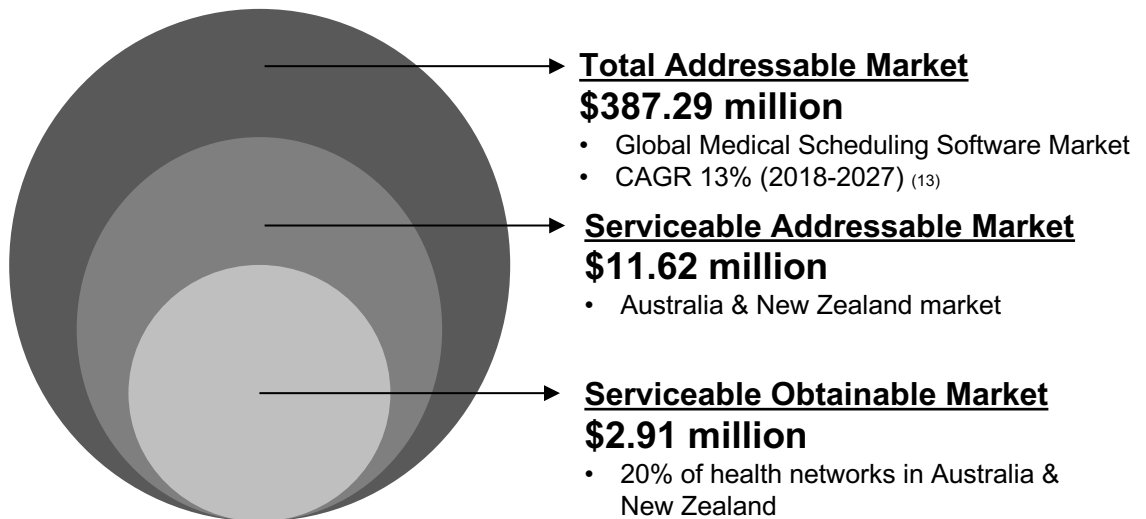
BPrompt can also risk-stratify patients more accurately and prevent unnecessary treatments. For example, if a patient has low-risk cancer but is classified as high-risk cancer, they will receive unnecessary cystoscopies leading to additional costs. BPrompt will mitigate this problem and reduce unnecessary cost due to human error.

Business Model

Risk and de-risking strategy

Risk	De-risking strategy
Funding • The cost to develop a web application is expensive and funding from investors will be needed.	Funding • Cost can be reduced if there are students who are able to code the web application. • If there are potential investors, the funding agreement should also be evaluated carefully. • Partnerships with healthcare organisations or companies can also be considered to diversify revenue and reduce risk.
Data security and privacy • Depending on the final prototype (whether the web app will be limited to healthcare providers with a database storing sensitive information OR be available to the public without having to login), patient data might be involved. • There will be significant problems such as financial losses and damage to reputation if there is data is breached.	Data security and privacy • Strong security measures must be implemented to protect sensitive data from breaches or unauthorized access. • A few measures include data encryption and ensuring secure authentication protocols.
Competition • There are reputable companies that specialise in developing healthcare related electronic tools. • Although there is no bladder cancer tracking electronic tool in the market now, these companies have the resources to develop one and sell it to their existing customers.	Competition • The web application must have unique features that will address problems that are not solved. • Partner with existing healthcare related tech companies to work on the product.

Market Analysis



Proposed KPIs

MIME/Monash Partners KPIs

Cancer

This solution fits within MIME/Monash Partners KPIs regarding cancer. This solution can be scalable to accommodate other cancer types such as breast, kidney and prostate cancer.

Hospital KPIs

Improved healthcare providers clinical workflow

It is expected that the solution will improve healthcare provider experience in managing patient care as there is less time lost in coordinating patient treatment schedules.

Increased patient safety

This solution creates an accurate treatment schedule based on the patient's pathology. This reduces the risk of missed or delayed treatments, thus decreasing the chance of the cancer from recurring or progressing.

Improved care coordination

The solution allows for care coordination between the treating team, patients, carers and general practitioners thus decreasing the lack of communication.

The Team



Prof Shomik Sengupta

- Consultant urologist at Eastern Health
- Professor of Surgery at the Eastern Health Clinical School of Monash University



Nicole Chek

- Medical student at Monash University

Ask

Expertise

Software development

- Our team doesn't have people with software development background.
- Having people experienced in the field work with us will be beneficial in developing the product.

Marketing

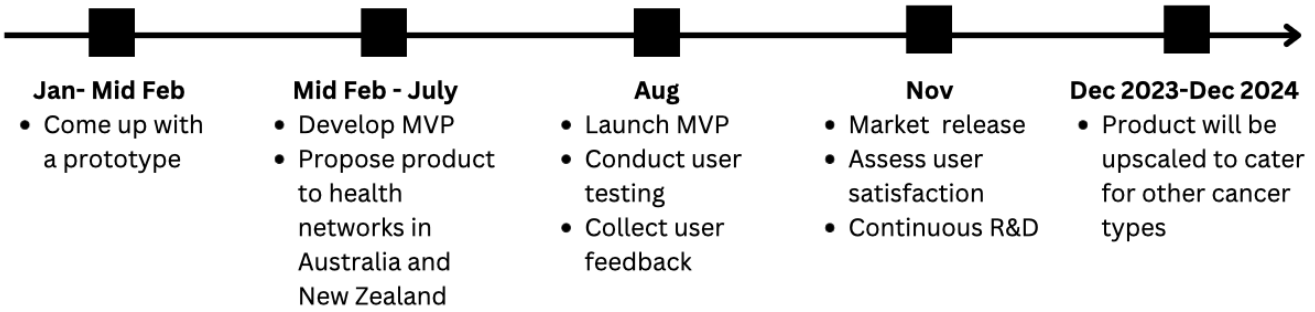
- Having people who have marketing background can be helpful in planning the marketing plan.

Funding

- The electronic tool can be costly to build so funding is required.

Timeline

2023



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