



WHITEPAPER

# HUMAN-FIRST HEALTHCARE

WHY DESIGN THINKING HOLDS THE KEY TO PATIENT  
EMPOWERMENT, BATTLING ELECTIVE CARE BACKLOGS  
AND BEATING BURNOUT



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with Tom Walker, David Champeaux and Sid Singh

# ABOUT

This project came about like many good things: serendipitously. I was finishing a course at Harvard Medical School in which we looked at burnout in health staff, my healthcare colleagues at Boston Consulting Group were talking about the elective care crisis and my dad was waiting patiently (pun intended!) for his own treatment.

I did a simple thing: I invited the best people I knew to explore a brief in reducing the elective care backlog in a way that mitigated burn-out in health staff and helped patients get the service they desired. During evenings, lunchtimes and weekends the team I put together worked through a number of design thinking exercises.

In days, not weeks, we generated our ideas and created this paper. The project was run completely virtually using tools like MIRO boards and Zoom. All time was given pro bono.

That said, even if we'd been paid, the techniques and methods we used, and the speed we worked at would have saved tens of thousands of pounds compared to 'normal' projects of this nature.

As such it is an object lesson in the power of putting a few expert, passionate minds in a (virtual) room and playing a problem collaboratively, in a focused and outcomes-driven way. These approaches and ideas have the potential to deliver systemic, transformational change in the services we provide. That's partly what we wanted to explore - how we can find a human-centred way to get through many of the complex challenges of healthcare provision.

It's a remarkable achievement and I cannot thank the people who gave their time and brilliance enough. I've included a list of acknowledgements in the paper but frankly, a list does little to say how excellent and selfless all these people were.

A last point: this project was run by Fuzzy, a not-for-profit innovation 'do tank', I had set up awhile back. If you are interested in learning more about what we do and why, feel free to make contact using the details given.

Best,  
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## **\_Foreword**

from John Glaser, PhD

# **HUMAN-CENTRED DESIGN AS A FOUNDATION FOR THE TRANSFORMATION OF HEALTHCARE**

**Retail, financial services, travel, movie and music distribution have all undergone significant transformations in recent years. The result has been major improvements in service and product quality and sophistication, efficiency, and accessibility.**

These transformations share several characteristics.

### **FIRST,**

the transformation of an industry is not the result of a single giant step forward that occurs over a short period of time. Rather the transformation is the result of many small, medium, and large advances occurring over years. At each step, the industry learns about the effectiveness of previous steps so that it can calibrate what should happen next. Industries that have been transformed are learning industries.

### **SECOND,**

transformation involves diverse types of changes. New digital technology. New business models. Restructured incentive systems. Altered regulations. New entrants with new ideas. All of these areas experience change and these changes must reinforce each other.

### **THIRD,**

the transformations in these industries invariably focus on the core processes that defined the companies in the industry, as well as those customers use to judge a company's performance. For example, regardless of the type of food it serves, a restaurant has three core processes: menu design, food preparation and wait service. If it performs any of these processes poorly, customer judgement will be harsh.

Retail has seen the transformation of the core process of ordering something. Banking has seen a transformation in the core process of consumers conducting transactions using mobile technologies.



Finally, there was a clear, unwavering focus on the customer. For successful companies, the transformation centred on delivering value to important customers. The customers could be consumers, suppliers, distributors, or employees. For a transformation to be successful, it must be embraced by its target customers. These organisations were able to clearly provide a compelling answer to the question “What’s in it for the customer?”

There have been many impressive efforts to transform the delivery of healthcare and the health of a country’s citizens. As laudable as these efforts have been, we are far from our goals. Healthcare remains in need of a transformation.

We should expect that the pressures to transform healthcare will increase due to several factors:

- The relentless pressures to improve care quality, safety and access and reduce costs.
- The growing power of consumers, in particular growing consumer comfort with digital technologies (accelerated recently by the Covid pandemic).
- The advent of new technologies – artificial intelligence, blockchain, the cloud – that provide the ability to tackle problems and take advantage of opportunities that have previously been out of reach.
- The sharp increase in venture capital and private equity investments in a diverse array of new companies that offer innovation healthcare and health products and services.

Human-centred design has become an essential tool in our efforts to transform healthcare. The approach uses collaborative workshops of clinicians and patients (the customers) to develop blueprints of transformed core processes of care. These blueprints identify the complete set of technology, workflow, role and cultural changes necessary to implement the new processes.

The blueprints are remarkably robust and can be developed quickly.

This whitepaper – entitled “Human-first Healthcare: Why design thinking holds the key to patient empowerment, battling elective care backlogs and beating burnout” – describes the application of human-centred design to a series of process problems associated with elective care procedures, including the patient backlog and healthcare provider burnout.

The work described is impressive and serves as a model for the relentless pursuit of transforming the processes and activities that are the foundation of care delivery and health management. The work will materially further our efforts to create the healthcare delivery system that we all envision; a healthcare system of exceptional quality, efficiency and accessibility.

John Glaser, PhD, is Executive in Residence at Harvard Medical School, former senior Vice President of Population Health, at Cerner Corporation, ex-chief executive officer of Siemens Health Services.

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# HUMAN-FIRST HEALTHCARE

Why design thinking holds the key to patient empowerment, battling elective care backlogs and beating burnout.

**Exploring the opportunities of design thinking to help healthcare providers improve patient outcomes, productivity and safety while reducing the backlog and staff burnout in elective care.**

COVID-19 has intensely magnified a string of interconnected problems associated with elective care procedures. In the UK alone, the NHS is now engulfed by a growing backlog of approximately 5 million patients, all of whom are currently awaiting care including cancer treatment and surgery. The pandemic has not only resulted in widespread delays but has also amplified a general sense of frustration and disempowerment among patients and carers.

As healthcare professionals around the world emerge from a heroic and frantic struggle to care for victims of the virus, COVID-19 has intensified the burnout challenge for an already fatigued workforce. Some experts now consider the problem of burnout among medical professionals to be an epidemic, with 50% of staff in the United States<sup>1</sup> found to experience related issues. The world is now facing an unprecedented double-edged challenge - i.e.

how to address the backlog whilst avoiding overburdening the workforce. Solving it will require a strategic and concerted effort that puts humans and design thinking at the heart of healthcare.

The important issues of volume and burnout are not the only compounding sources of pressure, with costs and resources also inhibiting efforts to respond to the backlog. Mounting pressures on elective care services across England have been the source of a £30 billion gap<sup>2</sup> between NHS funding and the projected costs of care in 2021. This colossal sum offers another lens through which to quantify the enormity of the crisis at hand.

In between waves of the pandemic in the UK, medical professionals strived against all odds to pivot from saving COVID-19 patients to tackling the elective care backlog. Despite their great efforts, the pressures of volume, cost and burnout took their toll. The National Audit Office (NAO) released findings alongside the NHS in October 2020 revealing that 162,888 patients in England had waited more than a year for a planned procedure, up from just 1,321 in October 2019<sup>3</sup>.

<sup>1</sup> Trends and Factors Associated with Physician Burnout - pp.2/10

<sup>2</sup> Monitor - Elective care main document - pp.5

<sup>3</sup> Figures taken from a Guardian article citing NHS statistics. For more see <https://www.theguardian.com/society/2020/dec/10/covids-devastating-impact-on-nhs-services-exposed-by-latest-figures>



**CAPTION:** Reports from professional healthcare bodies like the BMJ in the UK and the 'Coping with Covid' survey in the US show a marked increase in burn out and 'moral injury' in healthcare staff as a result of the Covid 19 pandemic.

Conscious of and concerned by this challenge on many fronts, we have taken action to build a detailed understanding of the opportunities for improving elective care while reducing the backlog and staff burnout. In collaboration with healthcare professionals, technologists, business strategists, software engineers and data scientists, we approached the issue from a perspective of human-centred design<sup>3</sup>. Armed with this array of expertise and powered by innovation 'do tank' [Fuzzy.org](https://www.fuzzy.org), we set out to generate ideas that:

- A. Effectively solve the challenges of the elective procedure backlog
- B. Empower patients to get the treatment and outcomes they need
- C. Prevent medical professional burnout among highly fatigued staff
- D. Create opportunities to improve safety

As well as forming a skilled and determined international team to explore solutions to these issues, we have already conducted virtual collaborative workshops to rapidly create an elective procedure 'blueprint,' as well as defining key opportunity spaces.

Most importantly, this has taken mere hours rather than weeks, with the project itself showcasing what can be achieved via human-centred design methodologies. In this paper we seek to raise awareness to these opportunities and ideas, highlighting the importance of taking a truly 'human first' approach. We believe there is tremendous opportunity to be unlocked by combining human expertise from a range of disciplines in a virtual room, wherein they can collaborate and rapidly solve problems. This approach becomes particularly powerful when ideas have human needs at the core, with technology applications and support built around them.

<sup>3</sup> Human-centred design is an approach to problem solving, commonly used in design and management frameworks that develops solutions to problems by involving the human perspective in all steps of the problem-solving process.

# THE BRIEF

The overarching goal of this project was to use human-centred design methods to create a set of resources to achieve the goals stated above. Using virtual collaborative workshops, we would rapidly build an elective procedure 'blueprint'. This would serve as a way to visualise the clinical pathway and provide a basis to form powerful ideas.

At the heart of the brief was the ambition to put expert human beings, patients, designers, technologists and healthcare professionals in a collaborative space. MIRO was our chosen platform, providing a means to demonstrate the power of collaborate, agile design thinking. By taking this holistic, expert-driven approach, we intended to rapidly generate ideas and conduct useful research.

We planned to develop rounded, pressure-tested ideas that had been validated by the people they were most relevant to, including doctors, nurses and patients themselves. Once our ideas had been painstakingly crafted and challenged repeatedly, the next goal would be to support these ideas with realistic steps to implementing them. A primary outcome defined in the brief was to share this thinking with frontline decision-makers in healthcare, including the NHS, other private healthcare providers and governments.

The people behind the human-centred thinking on this subject were another primary element of the brief, with its success dependent on multidisciplinary collaboration.

# OUR APPROACH

10 experts, 8 hours, more than 30 stress-tested ideas.

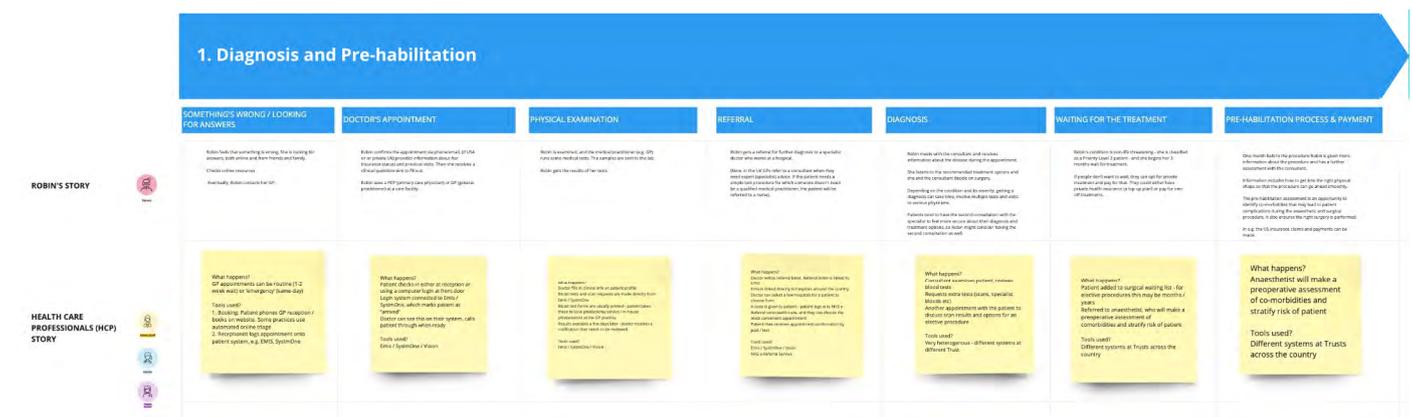
To deploy the capabilities of our skilled team in concert, we started out with a kick-off session to rapidly align on the brief, ways of working and the necessary tools. To build momentum towards the creation of a top-line elective care blueprint, the team carried out deep clinical pathway research and ran qualitative virtual Gemba walks.

Gemba walks offer the opportunity to step back from tasks, clearly understand the challenges and the value stream, and gain insight into which activities are the most valuable, encouraging efficiency and innovation. Due to COVID-19 we conducted these valuable Gemba walks using the MIRO platform, further demonstrating the collaborative benefits of the platform. One-to-one interviews with patients and medical staff also played a crucial role at the early stages of our approach, providing the core human insights necessary to identifying meaningful solutions.

These thorough initial steps positioned us well to create a detailed blueprint, using the hip replacement procedure as an example case.

Using this as a basis, our next step was to develop a detailed analysis of the patient pathways, and to do this we built detailed personas. This enabled us to effectively visualise and map out the key stages in the clinical pathway.

Having analysed the pathways of these patient journeys, the team was able to identify a series of pain and gain points in the process, for both patients and medical staff, as well as an understanding of where different agents in the journey crossed paths. We then took these findings and validated them with relevant subject matter experts, including patients, medical staff, designers and technologists.

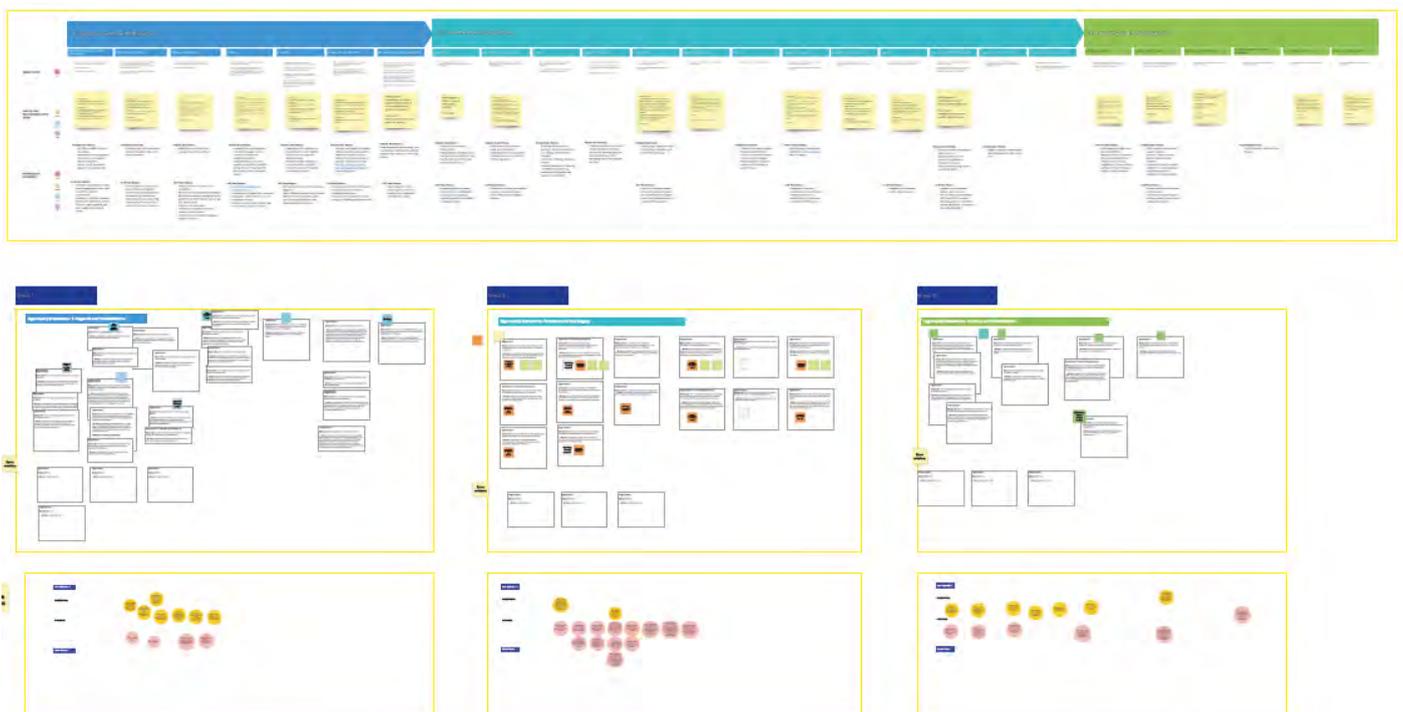


**CAPTION:** Healthcare professionals, designers, data analysts and other technologists collaborated using a blueprinting approach to systematically identify different user stories, pain and gain points in the clinical pathway. This enabled the identification of precise opportunity areas to innovate in.

By checking in with a range of key individuals throughout our approach, we ensured that our findings and ideas were pertinent and tailored to the needs of real people. With our findings validated by patients and medical staff, we ran an Ideas Workshop to pinpoint the opportunities for improved value at various points in the pathway. We launched this by starting with a kick-off session, before discussing the blueprint with patients and HCPS. Next, we moved on to the validation of the blueprint, positioning us well to begin identifying key opportunities before beginning the stress-testing process.

By combining the diverse expertise of the group, we were able to identify solutions to key challenges and propose a set of ideas.

Next, we set about pressure testing the best of these solutions and ideas in a First Cut Workshop, again incorporating subject matter experts to validate and hone the thinking. A further process of pressure testing and validation was then conducted, once again working with patients and medical staff to sharpen the efficacy and focus of our ideas. This intensive session involved discarding unnecessary elements, pivoting to different priorities and running principles. This combination of agility and rigorous validation played a crucial role in making such swift, high quality progress. Our approach demonstrates the unique value of human-centred, collaborative and co-creative design thinking, powered by multidisciplinary insights.



**CAPTION:** Ideas canvases were used to generate ideas and capture information on who the idea would impact on and it works. These points were then used to 'pressure test' the idea against the three criteria of backlog reduction, healthcare professional burnout prevention and patient empowerment.



## MAIN FINDINGS

With our expert team and processes established, we began generating and exploring solution ideas to tackle the multifaceted challenge. This was carried out by focusing on the individual patient experience phases, as well as generating ideas that would deliver benefits across all phases in a holistic way. The individual subsets included diagnosis and prehab, healthcare professional (HCP) burnout, safety and the backlog in elective care, in addition to the treatment and surgery phase.

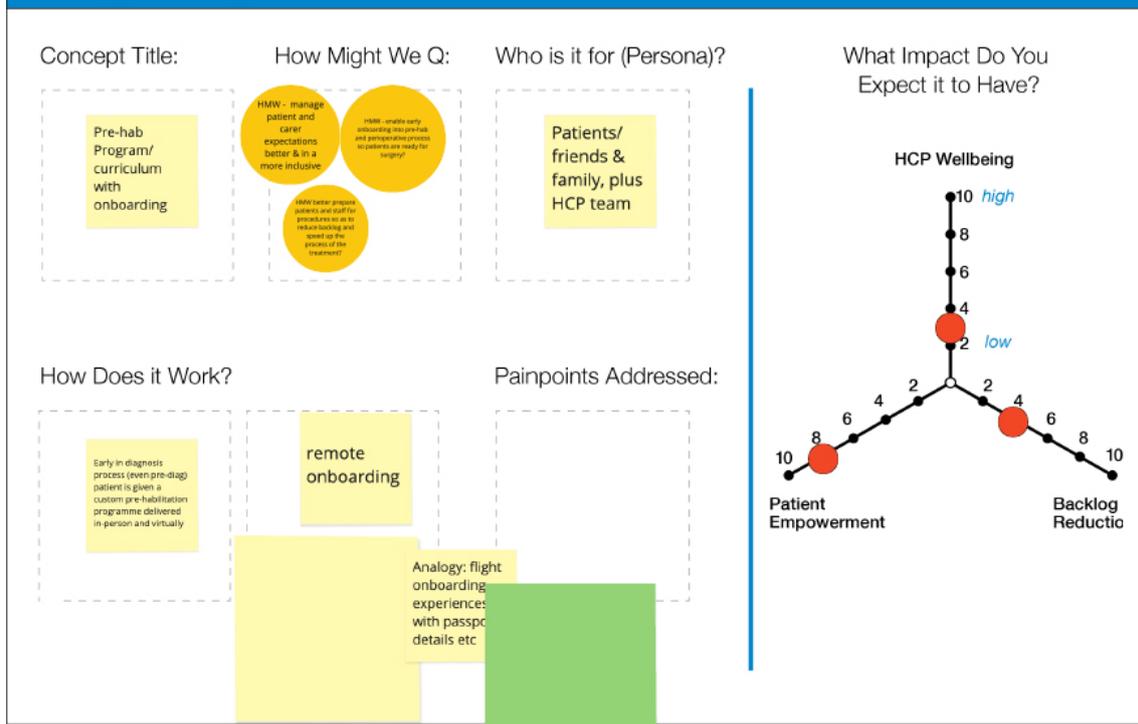
We worked in a highly collaborative way to develop these ideas, using MIRO to optimise our approach. This application of human-centred design thinking enabled us to rapidly generate a set of high-quality ideas, taking the patient journey and the perspectives of HCPs into account.

## \_IDEA 1

# **PREHAB CURRICULUM WITH ONBOARDING TO ENHANCE PATIENT EXPERIENCE**

An initial area we explored was how patient and carer expectations could be managed in a more effective, inclusive way. Clinicians have identified this as a key challenge that should be addressed as a priority. We were specifically interested in how to better prepare patients and staff for procedures, with an end goal of reducing the elective care backlog and increasing the speed of treatment. In terms of the desired impact of this idea, we developed this concept with patients, their friends and families as well as the HCP teams in mind.

## Stage: Diagnosis + Prehab



We theorised that this could be achieved by providing patients with a custom pre-habilitation programme as early as the pre-diagnosis stage. These programmes could be delivered both virtually via an engaging platform, and in person. The analogy we used to visualise how this process could work is preparing and onboarding for a flight abroad. The process would also consolidate the collection of useful data via a pre-habilitation curriculum that helps patients achieve the level of physical and mental health conditioning required prior to surgery. The curriculum also informs the patient about their progress, helping manage their expectations.

A key outcome from this idea we would expect to see is improved patient empowerment, by providing clarity and visibility of the procedure and next steps. An additional potential benefit of this solution would be a reduction in HCP burnout as administrative workloads can be more effectively managed as patients are more engaged, better informed and potentially less likely to seek additional medical support.

Conducting this prehab process would encourage patients to seek important pre-op medical advice

earlier, especially in regards, to conditions like diabetes and hypertension, again leading to upsides in health and more effective, precise service delivery.

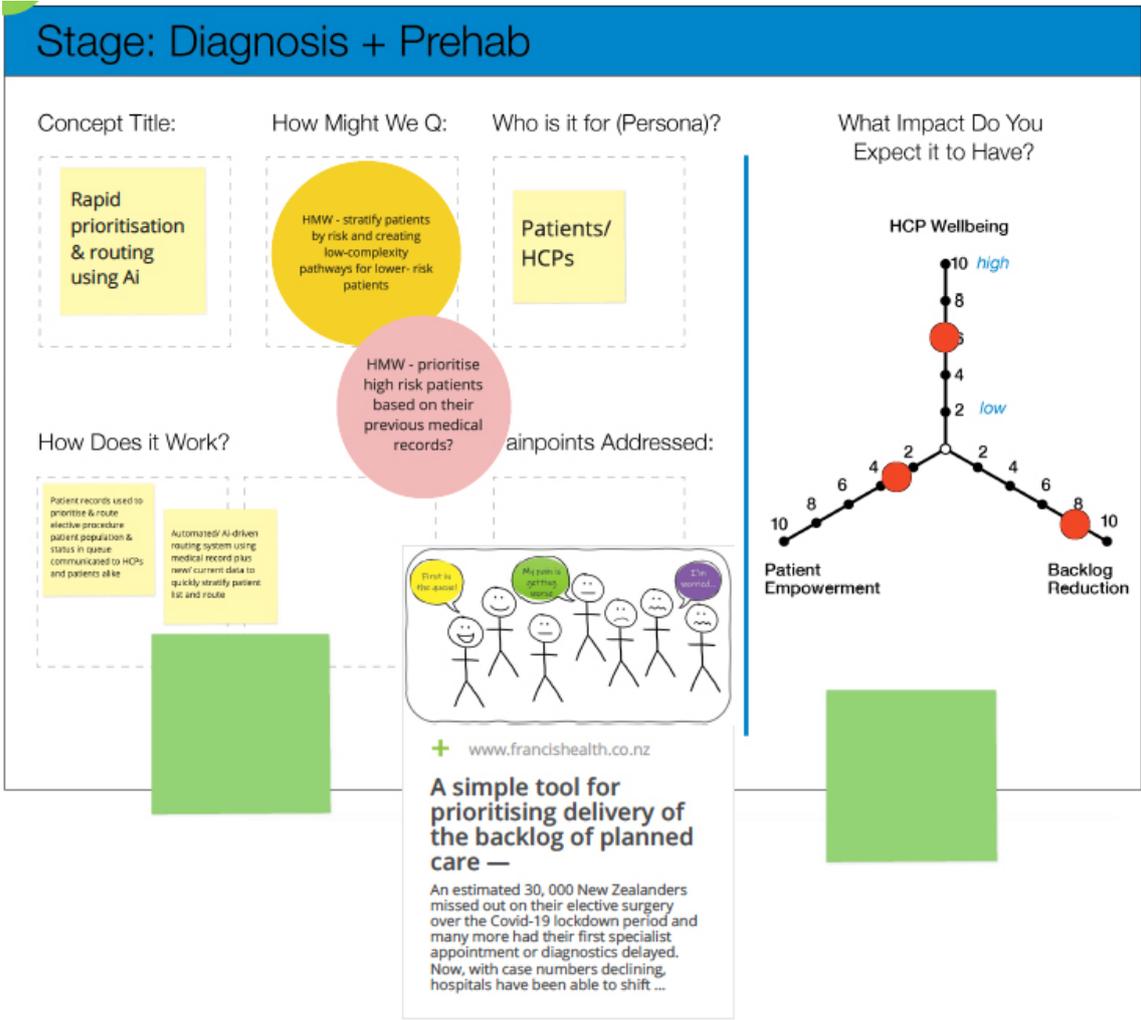
The clinicians involved in our ideation process pointed out that many problems arise from patients not being provided with a clear roadmap. Without knowing what is going to happen to them at various phases in the process, patients and HCP staff alike suffer from the confusion. Our proposed approach would both increase mutual visibility throughout the process, while also saving a significant amount of time and resources.

This idea could be developed and further improved through team check-ins, whereby patients could be introduced to the HCP team and vice versa. As with the prehab curriculum concept, this concept could also be carried out through human or automated means. An application could also be developed that would enable patients to visualise the steps ahead in their pathway, serving as a virtual roadmap and dynamic form of communication. Similarly, these ideas might also link to using AI and upstream diagnostic test results to anticipate risks, and adjust the prehab accordingly to reduce the risk.

## \_IDEA 2

# **RAPID AI PRIORITISATION AND ROUTING TO REDUCE HCP BURNOUT AND BACKLOG**

Another major pain point identified by clinicians is the quick and accurate prioritisation of patients, a factor that has contributed greatly to the growing backlog and rates of staff burnout. For this idea we sought to determine a means of stratifying patients based on risk, with low-complexity pathways set out for low-risk patients. In turn, the concept would involve prioritising high-risk patients based on their previous medical records, taking a holistic, human-first approach to care. Also the prioritisation could be dynamic, meaning that routing and scheduling into surgery is automatically changed based on the status of a patient's condition, for example readiness, change in need and so forth. The routing would then be adjusted so the risk of complication is reduced. As with many of our ideas, this one holds benefits for patients and HCP teams alike such as efficiency, effectiveness and safety gains.



To achieve this, our team highlighted the need for patient records and an analysis of pre-procedure diagnostics to be used to prioritise and route elective procedures. With factors like risk, population and current status considered, the information would then need to be contributed to HCPs and patients alike.

This could be achieved via an AI-based routing system that combines both new and existing patient data. Once the AI technology had handled the heavy lifting in terms of data, the automated routing could be based on a set of key criteria. Firstly, this would include the length of waiting time, otherwise known as the acuity index, alongside the urgency of the required treatment and surgical requirements. Other risk factors such as comorbidities like smoking, weight, etc would also need to be included to give a complete picture. While on the one hand this would provide the patient with clarity and reassurance of the

factors influencing their journey, clinicians would also gain immediate insights into the status of their patients via a dashboard.

A way of visualising this process is to think of the standard ASA classification, as well as the system used by the Royal College of Surgeons for COVID-19 prioritisation. These processes operate on a scale of minor, intermediate, major and high-risk scenarios, taking into account factors like fitness in light of anaesthesia. Deploying a holistic, integrated platform capable of delivering on this idea would be the most powerful way to take effective action on the towering backlog. One of the clinicians involved in the ideation stated that hospitals currently do not have an idea of prioritisation because booking is all paper-based, and that consolidating data and roadmaps in a dashboard would prevent patients coming to harm.

## \_IDEA 3

# **END-TO-END INTEGRATED COMMS AND TREATMENT SERVICES TO TACKLE ALL CHALLENGE AREAS**

Our team quickly identified another pain point when reviewing the standard triaging and diagnostic process. In particular, we highlighted the need for information related to these processes to be made quicker and easier for patients and HCPs to access, understand, manipulate and share, and for it to be more accurate and up-to-date. We set out to visualise how we could standardise communications practices and protocols, with the goal of improving information flow within the system.

To achieve this level of efficiency, all the critical elements needed for effective communication between various 'players' in the clinical pathway must be integrated into a seamless experience. Within this experience, patients and HCPs should be able to access the right information on demand, including details of progress, next steps and required actions for example in terms of diagnosis and treatment, patient condition, pre-operative processes, admissions, progress through the procedure, follow-up consult and so on. This would serve as a unified resource where data could be checked and questions could be answered, optimising the process and eliminating key pain points. Benefits for HCPs would include a decrease in time wasted by medical staff, for example tending to queries from patients unsure of the process, or caused by having to track down results, a reduction in staff burnout, and more effective and safe trafficking of patients through the elective care pathway. Upsides for patients include a reduction in anxiety at not knowing what the status regarding their progress is, less of a need for additional support, and clear view of the staff involved in their care pathway and their progress in it.

Linking to the first idea we outlined above, this process could also be optimised through a process of virtual team check-ins or a journey simulator application. This would further reduce confusion for both HCPs and patients, subsequently helping to tackle the backlog

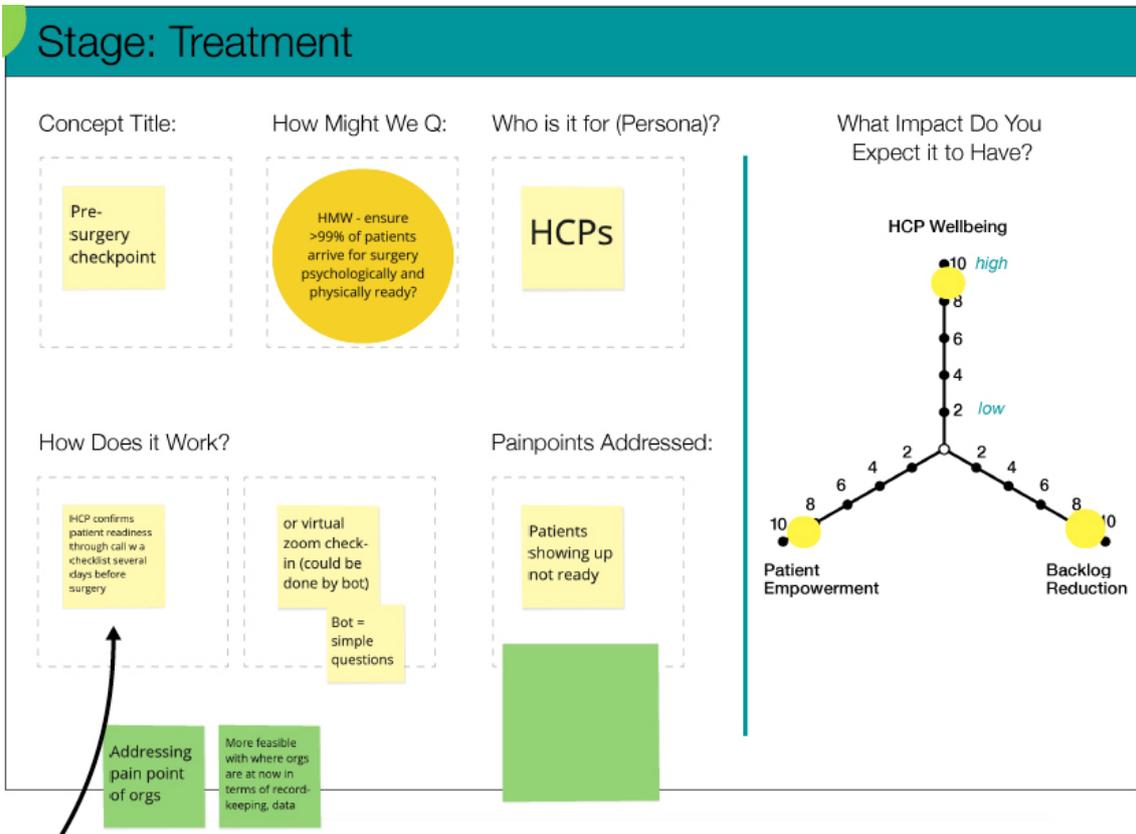
effectively while relieving pressure causing staff burnout. Our team pointed out that this platform would have to be designed in a highly streamlined, human-centric way, or risk causing an increase in queries and confusion.



## \_IDEA 4

# **OPERATIONS AIR TRAFFIC CONTROLLER**

The primary question we set out to answer in developing this idea was how we could ensure that over 99% of patients arrived for surgery ready, both physically and psychologically. By eliminating pain points that cause patients to arrive unprepared for surgery, the experience of patients and HCP teams could be improved while burnout rates and the backlog are reduced.



At the heart of this idea, we visualised the role of an air traffic controller in conducting the ongoing process of take-off and landing. Our idea involves a professional confirming patient readiness via a call in the weeks and days leading up to surgery, incorporating a checklist to accurately build a picture of physical and psychological readiness and a variety of risk factors. There are a range of technologies that could enable this dynamic, including Zoom calls that could be automated through the use of bots.

Conversational agents could also be used to effectively address routine pre-op procedure questions, 24x7, thereby helping give patients peace of mind (as they can freely ask questions and get answers as often as they want and whenever they want, without feeling they are bothering anyone), and without overly burdening the healthcare workforce. The system could be used to automatically flag when simple, preoperative requirements have not been undertaken. A prime example of this would be checking whether the correct blood tests had been conducted, the absence of which would delay surgery, reduce the quality of the patient experience,

and add to the backlog and HCP burnout rates.

Developing and deploying a solution like this holds the potential to drastically improve patient readiness. When patient readiness is improved, unnecessary admin and delays are reduced that subsequently cut down on staff burnout, while efficiently tackling the backlog. The process also improves safety, while improving the general experience and journey for both patients and staff. This increased patient preparedness would also reduce the number of claims from patients who may not have been provided with the right prehabilitation support, further reducing pressure on stretched HCP teams.

An additional element to add onto this idea is the notion of an automated 'traffic cop', tasked with scheduling ops and checking in with patients and HCPs in advance of operations. An automated solution capable of handling this task would deliver huge benefits, even as a vehicle via which to confirm the presence of the patient on the agreed date and to check the HCP team's readiness.

## \_IDEA 5

# **WEARABLES, SENSORS AND DIGITAL TWINS TO ENHANCE END-TO-END EXPERIENCE**

This concept was developed by the team while generating solutions to the challenge of patient recovery. The recovery period actually begins prior to surgery by introducing the patient to treatments such as physiotherapy routines using wearables and ambient sensors. Doing this early helps familiarise the patient with the devices while they're not frowzy post-op.

It also works to establish a baseline of data that they and their medical support can use to see progress made. Once a patient leaves the operating theatre and is moved to the ward, and when they are able to, they can pick up on the routines they've learned, helping speed discharge and aid recovery at home. In this expansive period of time patients often seek further support relating to queries that could be addressed in a more streamlined way, improving the patient journey and reducing HCP burnout.

Our team proposed the efficacy of deploying wearables to monitor various data points, which could be reviewed remotely by HCPs and by the patient for reassurance. This element could be synced up with a unified dashboard to make it easier for associated parties to stay up to date on data, while communicating in a more agile way.



With a real-time data collection process like this in place, the solution could be developed further to incorporate Digital Twin capabilities. This involves the creation of a virtual representation to serve as a real-time digital counterpart of a patient. To achieve this, all collected data could be automatically uploaded to a secure environment and made accessible to the patient. This would not only be useful for improving visibility and reassurance, but it would also be highly useful for patients to take with them to show other HCPs to rapidly bring them up to date

on their status. Types of data could include test results, notes from HCPs and NHS numbers, further simplifying the journey for both staff and patients by eliminating the paper trail. Another way to describe this could be as a single digital source of the truth.

Code could be used as a means of providing patients with access to certain notes they might need to view, while doctors could access the patient's profile by searching the patient's name on their internal database. The solution could take the form of a standard application, which could be rolled out initially via GP surgeries.

One of the clinicians involved in the generation of the idea stated that the use of a digital folder for patients would revolutionise the patient and clinician experience. They explained that it would provide a huge help across both elective and non-elective pathways and would help make pre-op assessments and pre-surgical processes more efficient.

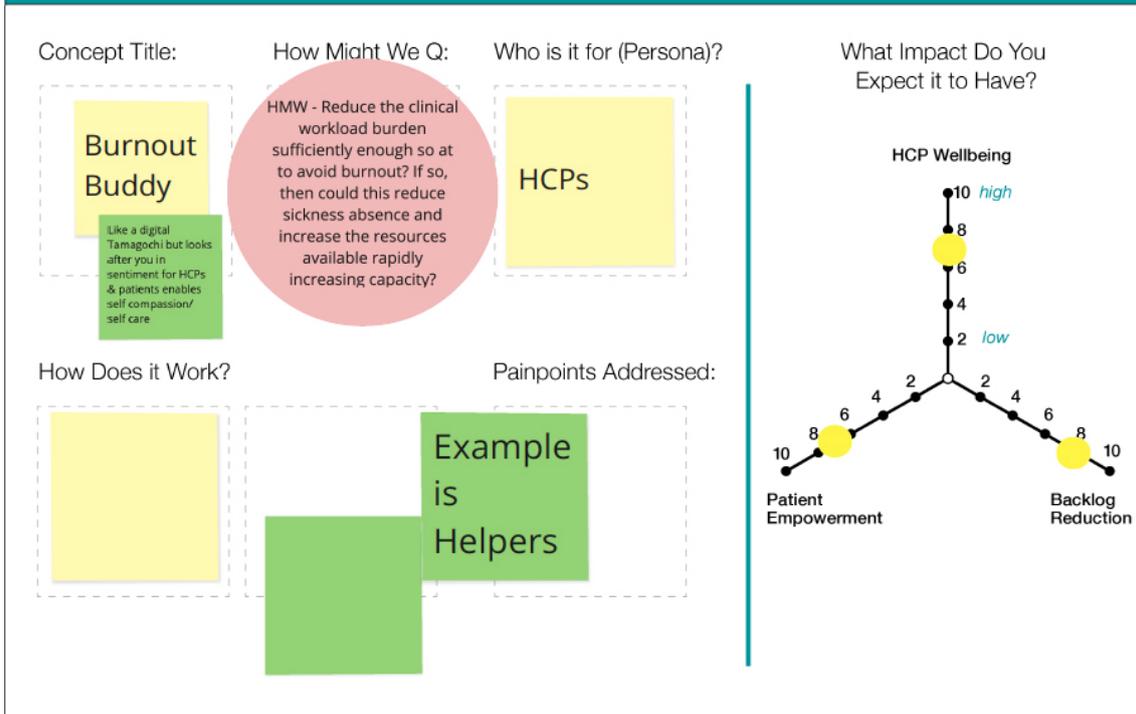
While digital folders are already utilised, clinicians have expressed frustrations at fragmented patient notes. For instance, GPs are unable to see hospital notes and vice versa, while trusts are unable to access the data of other trusts. Importantly, this concept would seek to eliminate these barriers and minimise on-the-day delays, while simultaneously increasing the number of patients who could be seen in a pre-op assessment clinic. This idea holds the potential to have a significant positive impact on the reduction of the elective care backlog.

## \_IDEA 6

# **THE BURNOUT BUDDY**

The team also focussed directly on HCP burnout during ideation, in addition to addressing the challenge as a by-product of other potential solutions. We wanted to figure out a way to reduce the clinical workload burden to a point that burnout could be avoided, subsequently reducing sickness absence and increasing available resources.

## Stage: Treatment



Our team came up with the concept of a digital Tamagotchi that would be designed to take care of its user. The device would enable HCPs to better understand and monitor their anxiety and stress levels, tracking hours worked and breaks taken, among other data points that are key to welfare.

Helping staff to be fit and well would be mirrored in patients, with HCPs in better able to provide optimal care at various points in the patient journey. This concept could potentially apply to clinicians across medicine as a whole and at all stages, not just in the case of elective procedures.

## \_IDEA 7

# **VIRTUAL PHYSIOTHERAPY**

Unnecessary overnight stays are costly in terms of space, resources and efficiency, with many patients unaware of ways to improve their comfort and condition without the support of an HCP. Having to come to hospital for additional care like physiotherapy reduces the quality of the patient journey, while also increasing the rate of staff burnout. Because of this, our team prioritised ideation around this challenge.

We developed the concept of a virtual physio, which would deliver in-bed training and a string of associated benefits. Crucially, this would enable patients to achieve muscle reconditioning in their own homes while simultaneously speeding up hospital discharging and free up vital beds. Subsequently this process would increase hospital throughput and support HCPs in quickly tackling the elective care backlog.



These virtual training sessions could continue on into the rehabilitation stage, reducing the likelihood of patient injuries at home that lead to further hospital stays. The virtual nature of this solution would also reduce the need for nurses to visit patients at home, enabling them to prioritise higher priority care activities. A reduction in the demand for home visits would further reduce HCP burnout, while also contributing to the rapid reduction of the backlog.

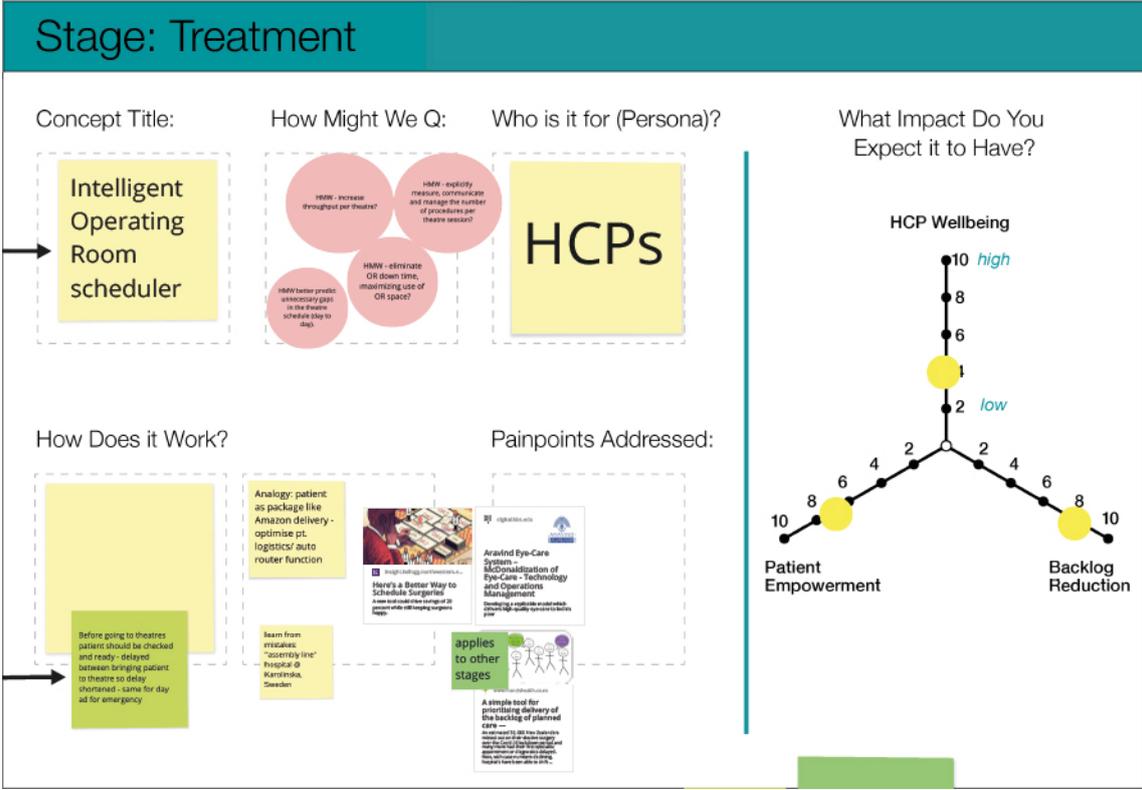
While it will remain crucial for a nurse or physiotherapist to be on hand to ensure patients can stand adequately, virtual physio could be highly effective for in-bed therapy. This would reduce the need for home visits as the risk of injury would be very small.

Cutting down on unnecessary overnight stays was highlighted by clinicians as another important challenge to tackle. In some cases, hospital stays are extended due to transport inefficiencies and safety concerns, which if identified and addressed could significantly increase hospital capacity and throughput. Solving recurring inefficiencies like this will play an essential role in reducing the backlog.

## \_IDEA 8

# **INTELLIGENT OPERATING ROOM SCHEDULER**

Optimising throughput will be essential to remedying all of these challenges, making it a primary target for our experts. We set about generating ideas for how to increase throughput per theatre, measure and manage the number of procedures conducted per theatre session and eliminate downtime. In addition to this, we also explored ways to leverage technology to predict unnecessary gaps in theatre schedules to optimise throughput and efficiency while maximising care quality.



The team developed an idea that involved designing an algorithm that averages theatre anaesthesia times, so as to optimise and automatically reorganise daily schedules. A conceptual stimulus here could be the process of packaging and scheduling an Amazon delivery, ensuring that gaps are eliminated, and routes are automatically mapped out.

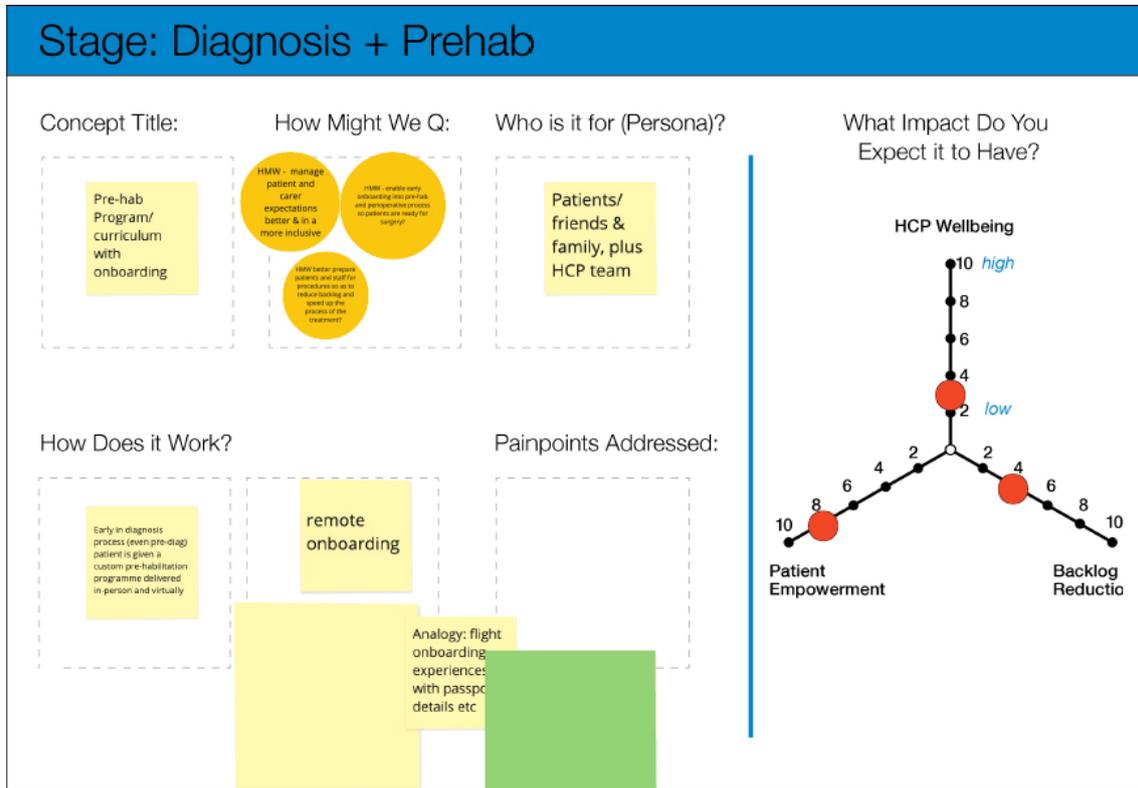
As an addition to this idea, the team explored ways that HCP work schedules could be rethought to expose trainees to different types of procedures. Through the use of an algorithm, trainees could gain a much richer cross-section of experience, helping to tackle skills gap issues and redeploy emerging talent to areas where they are most needed. Although sticking points remain in terms of information governance and highly specialised departments, the process would incorporate well with our Intelligent Operating Room Scheduler concept. Having more HCPs trained in specialised areas would increase safety and the ability to efficiently tackle complex procedures adding to the backlog.

## \_IDEA 9

# **REHAB OVERVIEW**

Clarity of information is a crucial component in patient empowerment, and we explored ways in which rehab information could be made clearer both before and after surgery. Crucially, we wanted to identify ways to reduce stress for patients throughout the process by ensuring they know what to expect at each stage. In turn, this would benefit HCPs by improving patient readiness, reducing unexpected challenges at critical moments.

## Stage: Diagnosis + Prehab



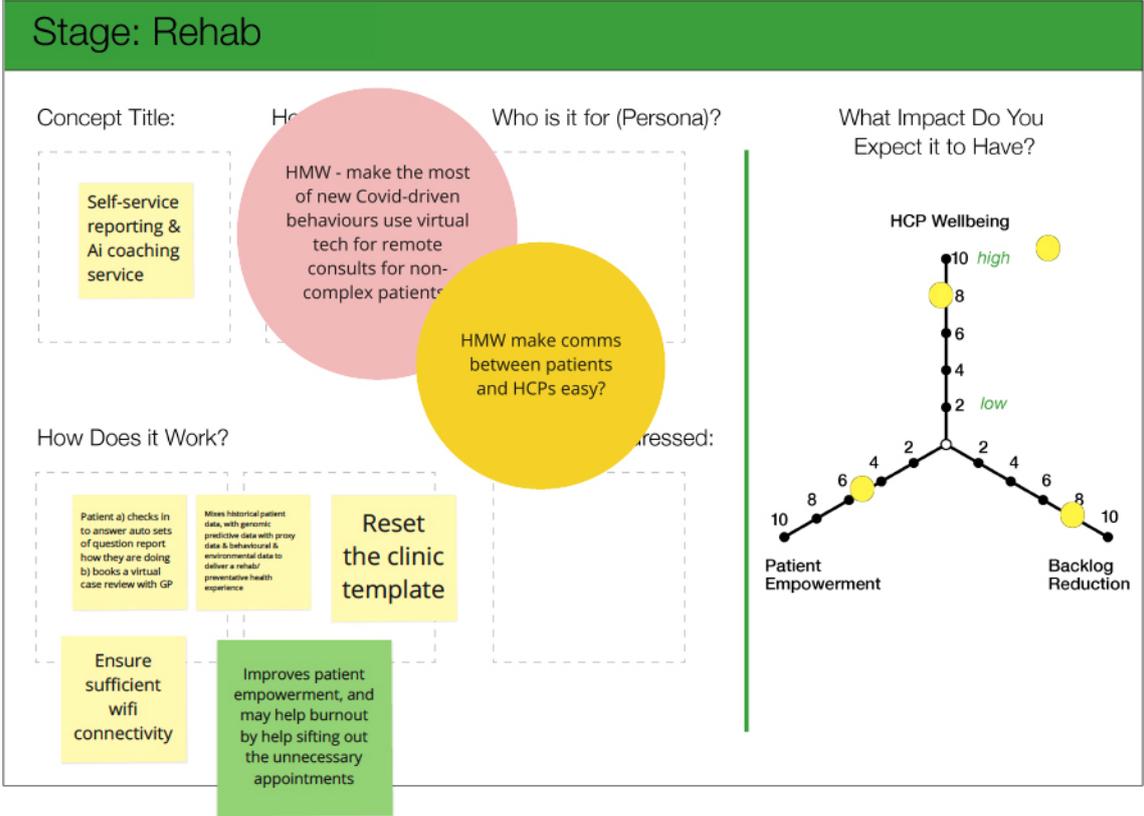
To enable this, we developed and tested an idea around an AI-based concierge system, which would ultimately adapt to the needs of the patient as they progress through various stages in their journey. This system would leverage robot process automation and be fed progressively with data, adding up-to-date clarity around the length of the rehab process, points of contact, what to expect, recovery milestones and when the next check-in is.

Safety would be the core benefit of this idea, not only for patients, but also for HCP staff. The system would reduce the administrative burden that is commonly linked to staff burnout, enabling them to focus their energy on their vital hands-on work.

## \_IDEA 10

# **AI AND MACHINE LEARNING COACHING AND REPORTING SERVICE**

It occurred to the team that there is also a need to maximise the benefits of COVID-driven behaviours. Principally this refers to the use of virtual technology for remote consultation in the treatment of non-complex patients. We tasked ourselves with identifying and testing ideas that would enable more simple, effective communications between HCPs and patients.



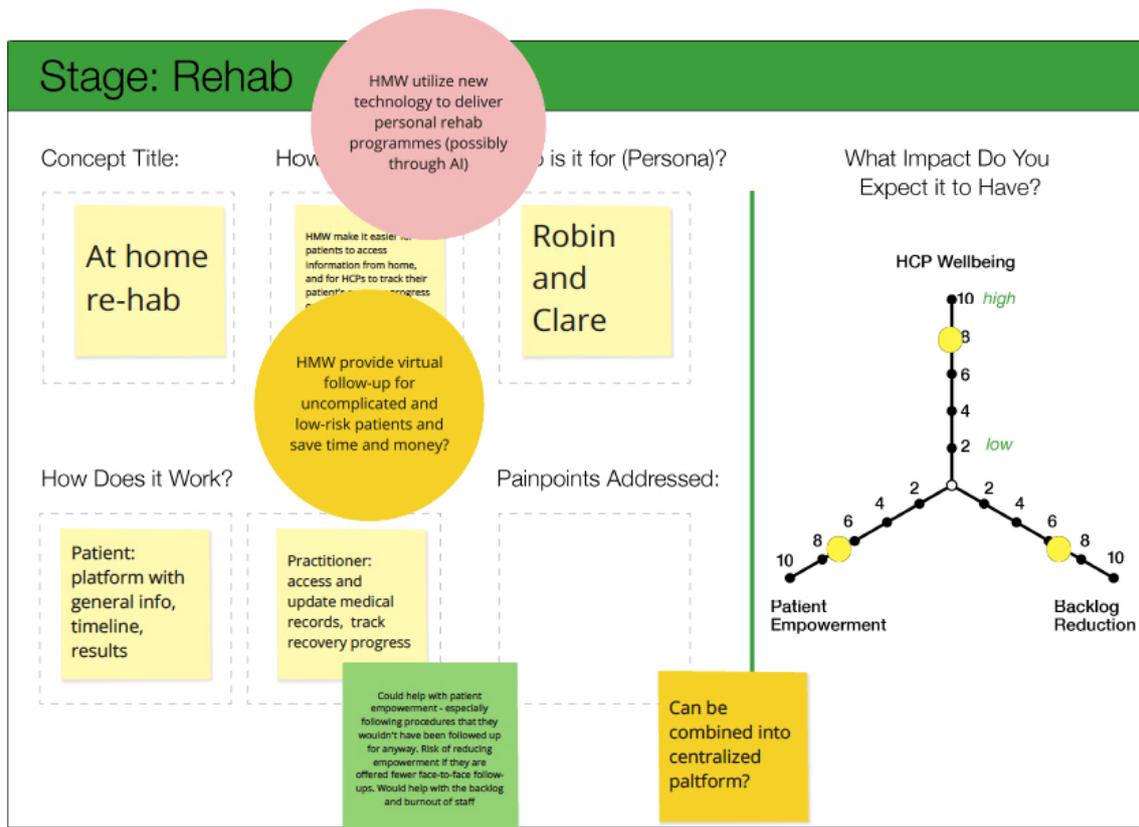
The idea we developed and tested can be described as an AI/ Machine Learning coaching and self-service reporting system. It would incorporate historical patient data with genomic predictive, behavioural and environmental data. The system would 'learn' about the patient and leverage data sets holistically, so as to deliver a more effective rehabilitation and preventative experience. The process would involve patients checking in to answer sets of questions to report their health status and progress, while automatically booking case reviews with GPs. It could also incorporate data collected passively (e.g. via ambient or wearable sensors) or actively (e.g. via home diagnostic tests).

Once again, patient empowerment is a key benefit that would be enabled by this concept, but it would also be effective in tackling HCP burnout. By tracking patient wellbeing in an efficient, automated way, the number of unnecessary appointments could be reduced. The result of this would be a further reduction in the administrative burden faced by staff, subsequently helping to alleviate HCP stress.

## \_IDEA 11

# **AT HOME REHAB**

Linking closely to the two ideas discussed previously, we developed this line of thinking by exploring ways to provide virtual follow-up sessions for low-risk patients. As part of this idea, we also theorised ways in which new technologies could be harnessed to deliver personal, potentially AI-driven rehabilitation programmes.



For the patient, this idea in practice could be delivered as a centralised platform, providing general information, key timelines and results. The practitioner would also have access to this platform, via which they could access and update medical records while also tracking recovery progress remotely. A platform such as this would significantly boost patient empowerment, particularly following

procedures where a follow-up would not normally be required. It would be important not to allow this platform to reduce face-to-face follow-ups where they are necessary, as this could reduce empowerment. HCPs would benefit from this platform through a reduction in stressful administrative burdens, while also having to attend fewer unnecessary face-to-face follow-ups and consultations.

# NEXT STEPS

In a recent Harvard Medical School paper on solutions for administrative burden and provider burnout by David Y. Ting, Chief Medical Information Officer of the Massachusetts General Physicians Organization, doctors were asked the question: "What is burning you out?" The answer included in the paper is very important,

*"It's the administrative burden of taking care of patients, not the hands-on patient care."*<sup>4</sup>

This statement provides valuable insight into the pressures on HCPs, indicating strongly that the systems and processes used widely for administration are at the heart of today's challenges. It is plain to see that there is room for human-centred design and innovation to drastically improve the experience of professionals and patients alike, which would have the knock-on effect of tackling the elective care backlog we face today.

It is ideas like those generated by our experts that will remedy these problems with the right support and backing, leveraging cutting edge technology and design thinking while putting people at the heart of solutions. The outcomes would include a huge reduction in the rate of HCP burnout, optimised patient pathways to ensure better, safer experiences, and subsequently a rapid and effective response to the ever-growing backlog.

Our primary next step is to share our ideas and findings with key healthcare decision-makers in the NHS, the UK government and around the world, making it clear that revolutionary progress is within reach with the right approach. We look forward to having open discussions and collaborating widely on these ideas, and to demonstrating the transformational potential of design thinking.

<sup>4</sup> Harvard Medical School – Industry Insights, December 16, 2019, pp.2



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