



## Design Exchange Partnership Forum

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# Design Exchange Partnership

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*Interaction and service design of a virtual health  
hub for patients with cardiovascular disease*

**Professor Justin Magee:** Professor of Product Design & Research Dir. (PI)

**Dr. Kyle Boyd:** Lecturer in Interaction Design (Design Associate)

**Dr. Aaron Peace:** Consultant Cardiologist, R&D Dir. for WHSCT, CEO of C-TRIC

## Background IP

### WHST: COVID-19 response

- 24/7 Cardiology Telephone Triage service
- Evaluation: 1000+ beneficial engagements
- Strong patient satisfaction  
(time, travel, parking, hospital navigation)

## Problems

### Clinician Concerns

- Did Not Attend (DNA) rates
- Objective assessment of cardiovascular health
- Vital signs measurement  
(Heart rate, Blood pressure, Weight, Bloods)

# Design Research

Ulster University:

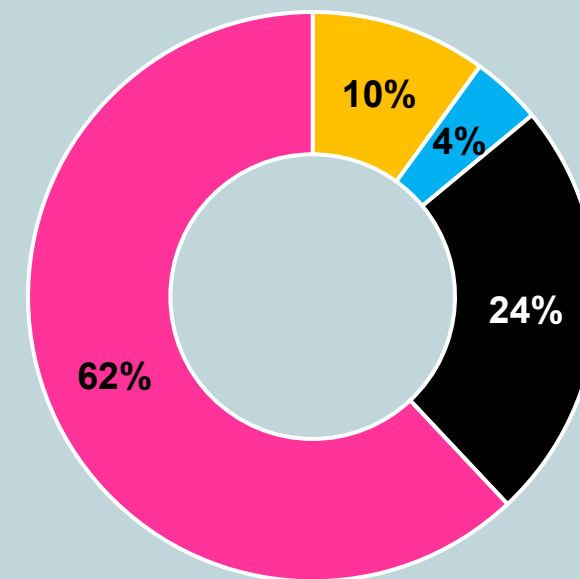
Net Zero adaptation project (personal travel)

- **Synthesise complexity / understanding**
  - Co-design
  - Ideation
- **IXD: Patient flow management app** DNA rates & Objective measurement
- **SD: Cardiology virtual assistant**  
Vital signs measurement

- Personal Travel
- Comissioned Services
- NHS carbon footprint
- Meicines, Equipment & Supply chain

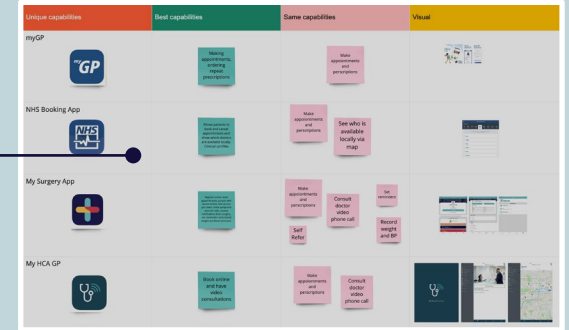
## NHS Carbon Footprint +

NHS (2020) [“Delivering a ‘Net Zero’ National Health Service”](#)



# Heart Hub

## Competitor Analysis



## Personas & Problem Statements

**Henry Mateer**

**Quote**  
"I have lived for over 90 years and now they want to bring me to the hospital. Why can't I see someone at my local surgery?"

**Story**  
Henry Mateer is a retired farmer from County Tyrone. Henry still keeps a few heifers and sheep to keep him occupied and the farm still going. He developed a heart murmur after a period of illness. Given his age and status of living alone the cardiologist wishes to see him every two weeks.

**Goals**

- Wants to see his cardiologist face to face.
- Wants to get well
- Limit the amount of appointments needed.

**Needs**

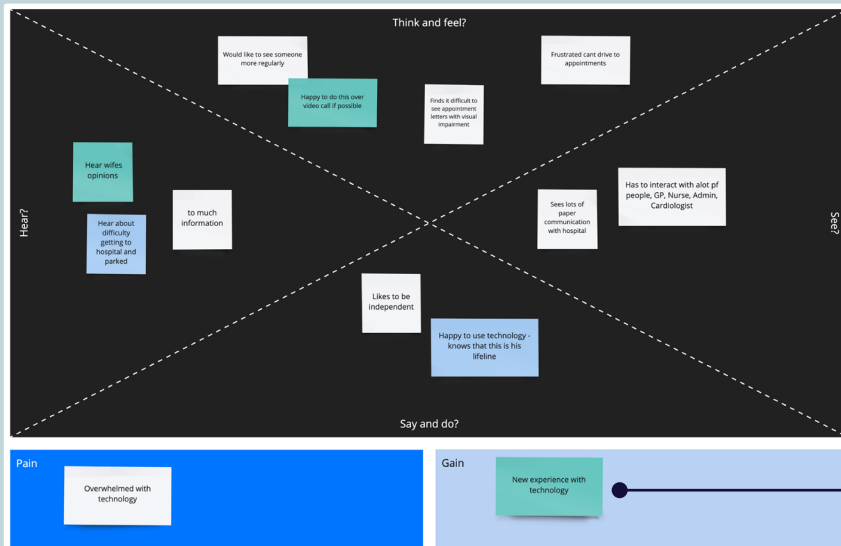
- Wants to see his cardiologist locally.
- Doesn't want have to use any technology, just wants to meet face to face.

**Frustrations**

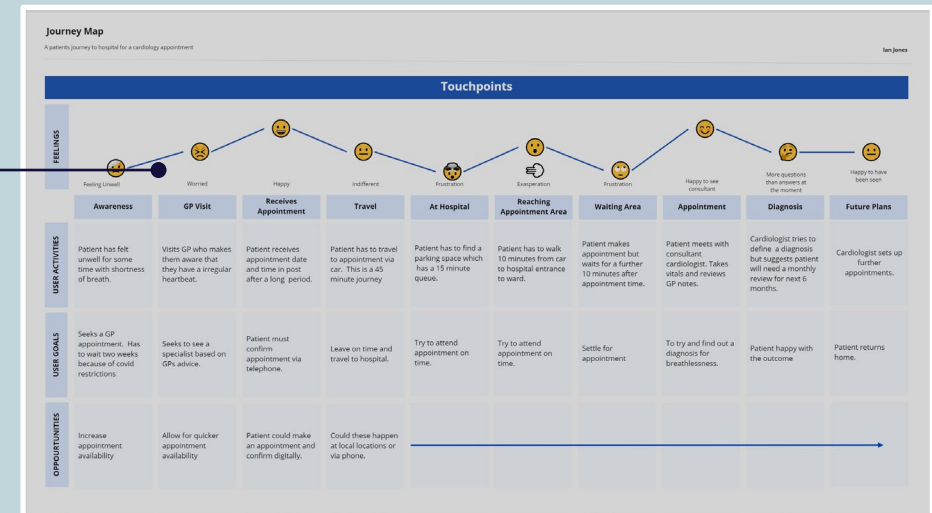
- His effort to travel to the hospital, relies on extended family
- Feels exasperated after the appointments are over, travelling home
- Can't use modern phones.

**Technology Use**

- Telephone only, no smartphone



## User Journey Map



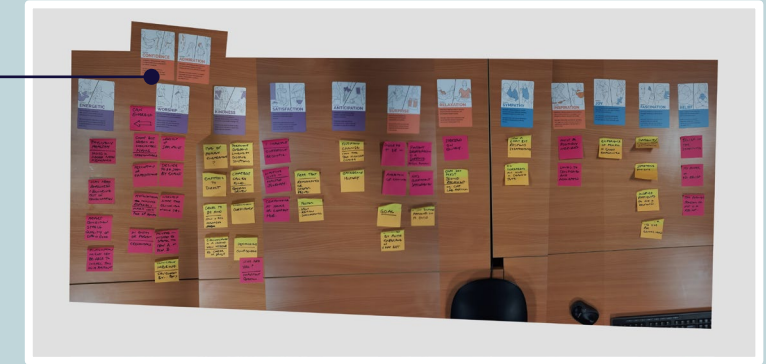
## Empathy Map

# Heart Hub

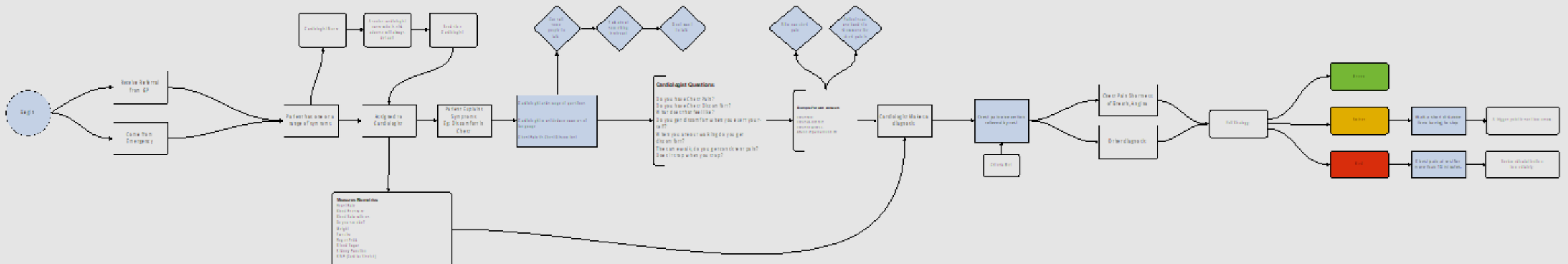
## Ethnographic Conversations



## Positive Design

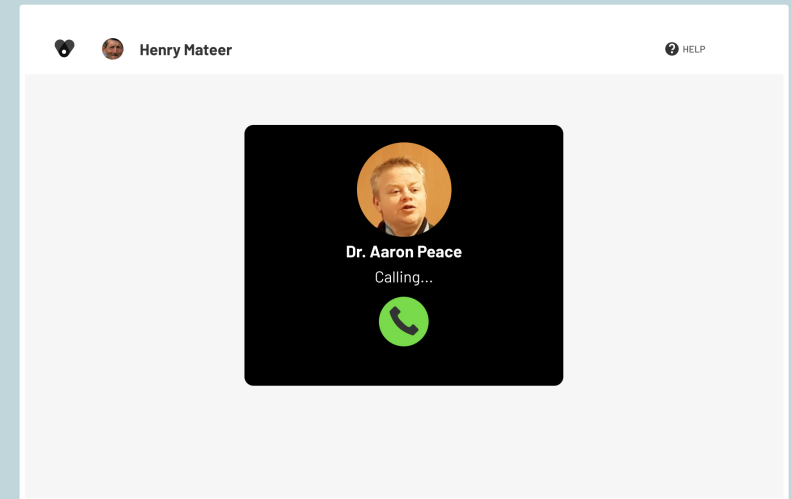
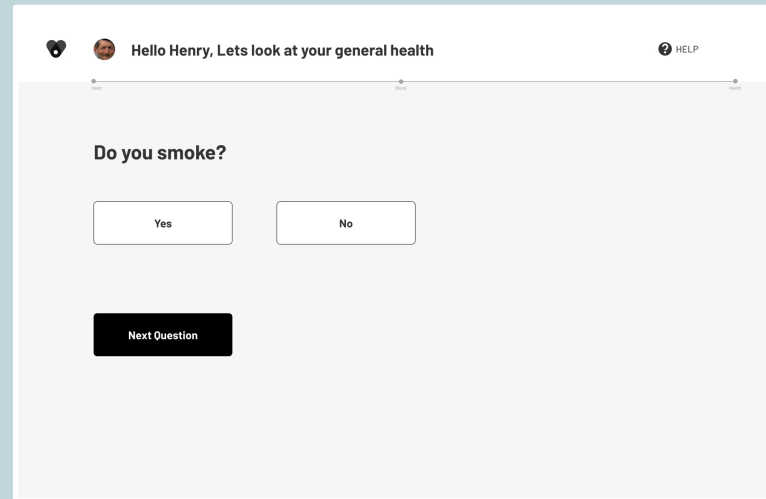
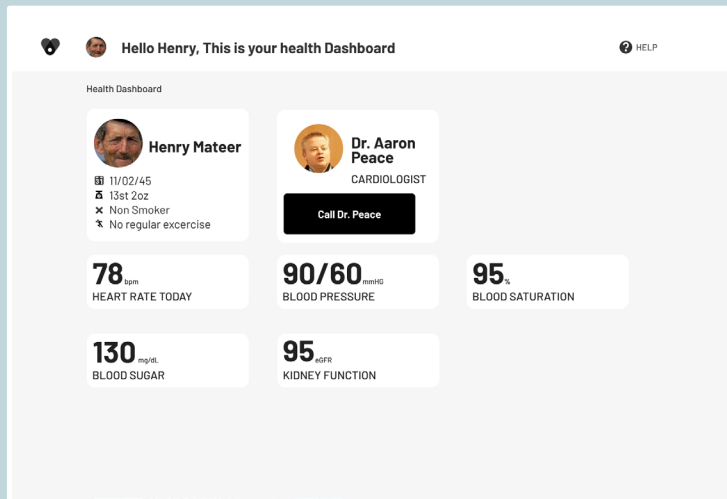
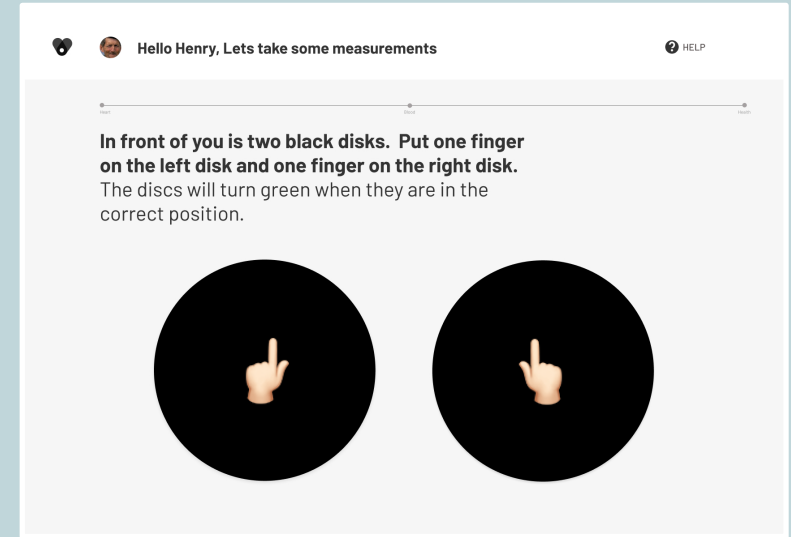
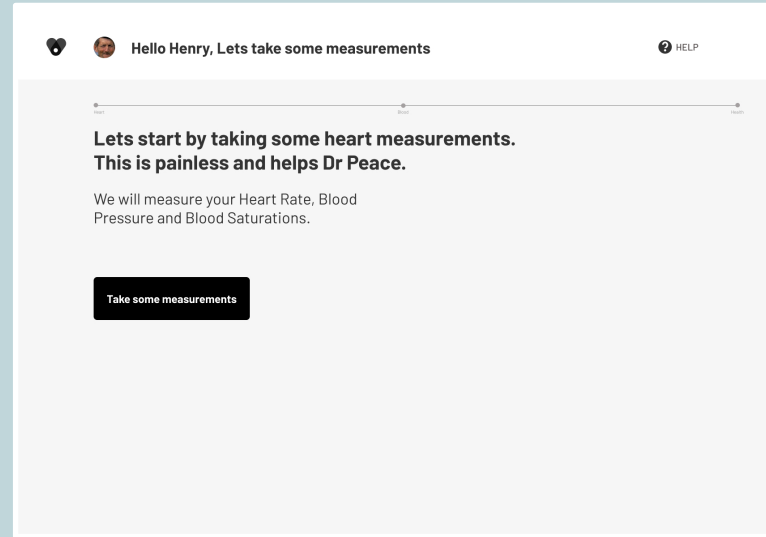
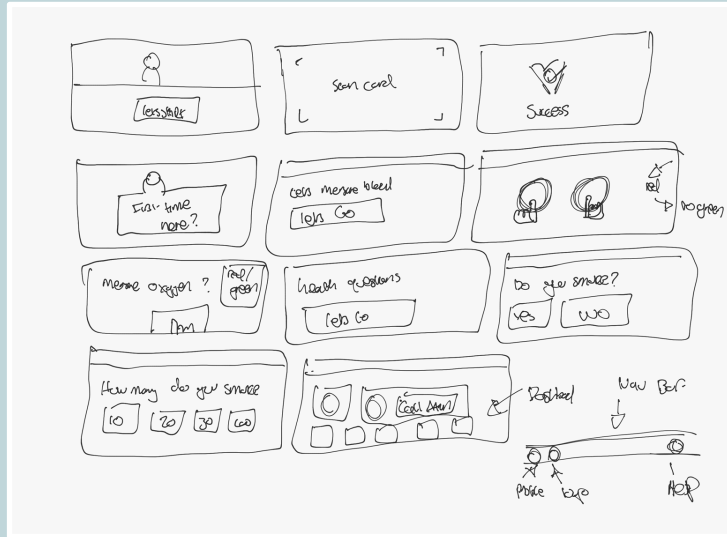



## Task Analysis



# Heart Hub

## Lo-Fi Prototypes / Mi-Fi Prototypes






**Agnes Allistar**  
Patient

**Lets Get Started**

Scan your  
Health and Social Card to login



This lets you login to Heart Hub securely.  
Place card on Scanning area.

Hello Agnes, This is your Health Hub Dashboard. HELP

**Lets start by taking some heart measurements. This is painless and helps Dr Peace.**


We will measure your Heart Rate, Blood Pressure and Blood Saturations. It is fast and painless.

**Take some health measurements →**

Hello Agnes, This is your Health Hub Dashboard. HELP

**In front of you is two black disks. Put your left index finger on the left disk and the right index finger on the right disk.**

The discs on the screen will turn green when they are in the correct position.



Place fingers on disks like this

Hello Agnes, This is your Health Hub Dashboard. HELP

**How much do you weigh?**  Stones or Kilograms


Less than 10st   10-15st   16-20st

21-25st   26-30st   Over 30st

**Next question →**

Hello Agnes, This is your Health Hub Dashboard. HELP


**Success!**  
All questions have been answered




**Next Step →**

Hello Agnes, This is your Health Hub Dashboard. HELP

Health Dashboard



**Agnes Allistar**  
11/02/45  
13st 2oz  
Non Smoker  
No regular exercise



**Dr. Aaron Peace**  
CARDIOLOGIST

**Call Dr Peace**

**78**  
HEART RATE TODAY

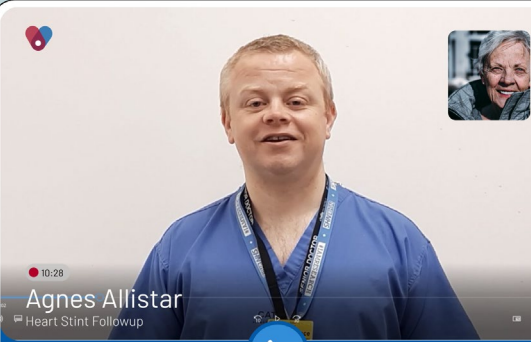
**90/60**  
BLOOD PRESSURE

**95**  
BLOOD SATURATION

**130**  
BLOOD SUGAR

**95**  
KIDNEY FUNCTION

Measure Heart, Blood and Health Again



10:28

**Agnes Allistar**  
Heart Stint Followup

Video call controls: Call, Mute, Video Off, End Call



## Challenges

- Post-COVID logistics
- HR pressures within the CAU
- Time & synchronisation
- Engineering Technology & AI under development (2 x PhDs)



## Progress & Impact

- Collaborative Agreement (until March 2023)
- Co-design activities delivered (2 cardiologists, 3 Senior Nurses)
- Prototypes produced

### Next Steps

- PPI – Research Masters Project (Senior Nurse)
- IRAS - user testing
- Product Development