Health Systems Design

Hackathon

Zoom Meeting

Valeria Pannunzio
Anja Maier
Nicholas Ciccone
Professor P John Clarkson
Timoleon Kipouros
Michael Deininger
Göran Gustafsson
Alix Feldman
Jiwon Jung
Aylin Karadeniz Küçük
Claudia Eckert
Sabah Farshad

1_2021.08.16.Maier-ICED21 Health Systems Design SIG Hackathon.pptx - PowerPoint

Transitions | Animations | Slide Show | Review | View | Acrobat | Tell me what you want to do... | Anja Maier | Share

Float In | Split | Wipe | Shape | Wheel | Random Bars | Grow & Turn | Effect Options | Animation

Add Animation | Animation Pane | Trigger | Animation Painter | Advanced Animation

Start: With Previous | Duration: | Delay: | Reorder Animation | Move Earlier | Move Later | Timing

ICED 21
GOTHENBURG 16-20 AUG

the Design Society
a worldwide community

https://healthsystems.designsociety.org/

Health Systems Design
Hackathon

Slide 1 of 14

Notes | Comments | 84%

Type here to search

15°C Regn kommer

09:03
16-08-2021

Timeline

START
9:00-9:05: SIG and Hackathon introduction
9:05-9:20: Ignite talks: Systems ways of seeing (DTU, Cambridge and TU Delft)
9:20-9:30: Astra Zeneca: Challenge framing, narrative stories
9:30-9:45: BREAK
9:45-10:25: Zoom breakout groups and Miro canvas creation
10:25-10-40: BREAK
10:40- 11:20: Canvas presentations (5 min each) and discussion.
11:20-11:30: Popular vote, jury vote with Astra Zeneca, and prize
11:30-11:45: Feedback and reflections
11:45-11:50: Closing remarks
END

12:15–12:45: Health Systems Design SIG Steering Committee meeting

Special Interest Group

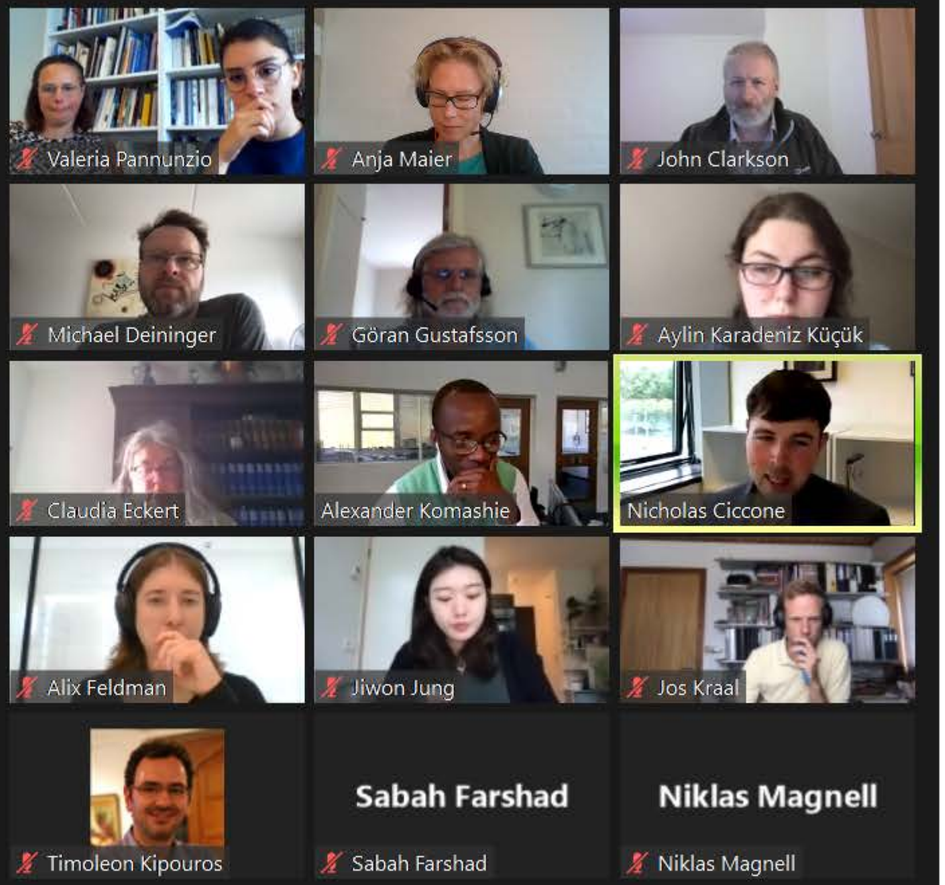
Health Systems Design

Zoom Meeting

You are viewing Nicholas Ciccone's screen

View Options

View



Participants (15)

Find a participant

- Anja Maier (Co-host, me)
- Valeria Pannunzio (Host)
- Nicholas Ciccone (Co-host)
- Alexander Komashie (Co-host)
- Alix Feldman (Co-host)
- Aylin Karadeniz Küçük (Co-host)
- Claudia Eckert (Co-host)
- Göran Gustafsson (Co-host)
- Jiwon Jung (Co-host)
- John Clarkson (Co-host)
- Jos Kraal (Co-host)
- Michael Deininger (Co-host)
- Niklas Magnell (Co-host)
- Sabah Farshad (Co-host)
- Timoleon Kipouros (Co-host)

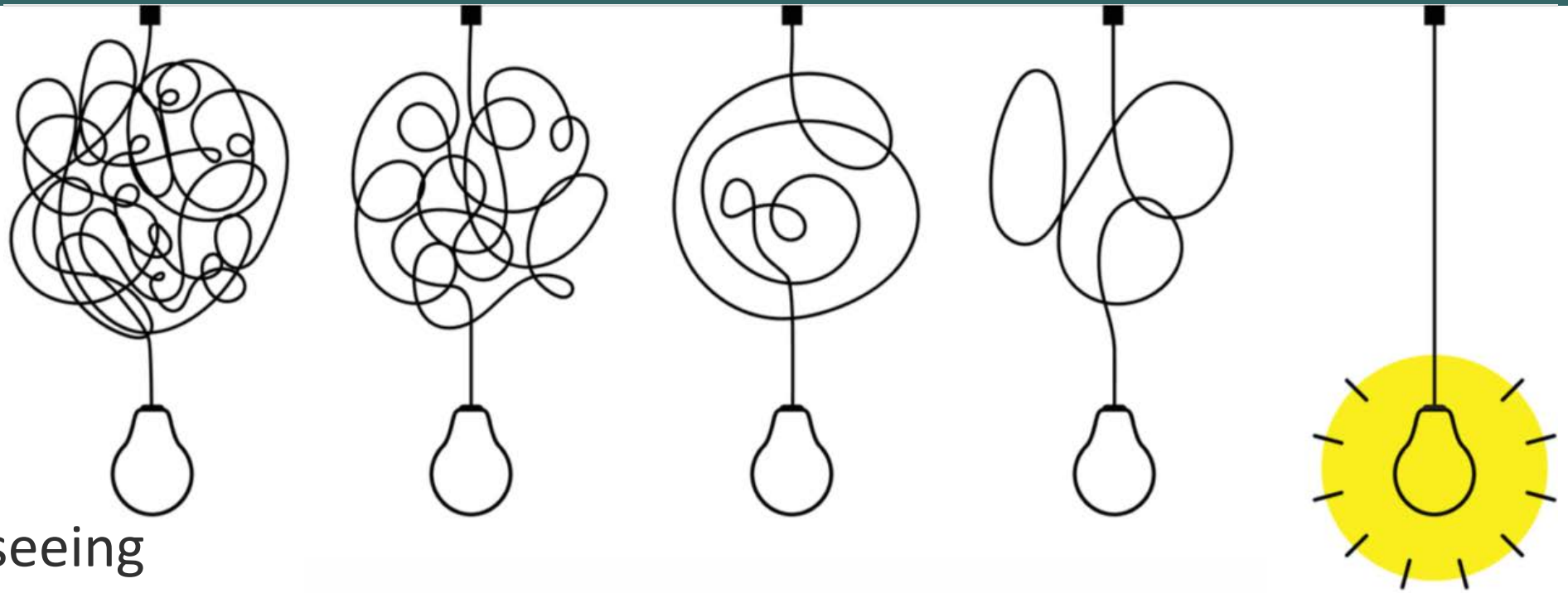
Invite Mute All ...

Unmute Stop Video Security Participants 15 Polls Chat 1 Share Screen Record Breakout Rooms Reactions Apps Leave

Type here to search

15°C Regn vil stoppe

09:11
16-08-2021



A systems ways of seeing

Ignite talks

ICED 21
GOTHENBURG 16-20 AUG

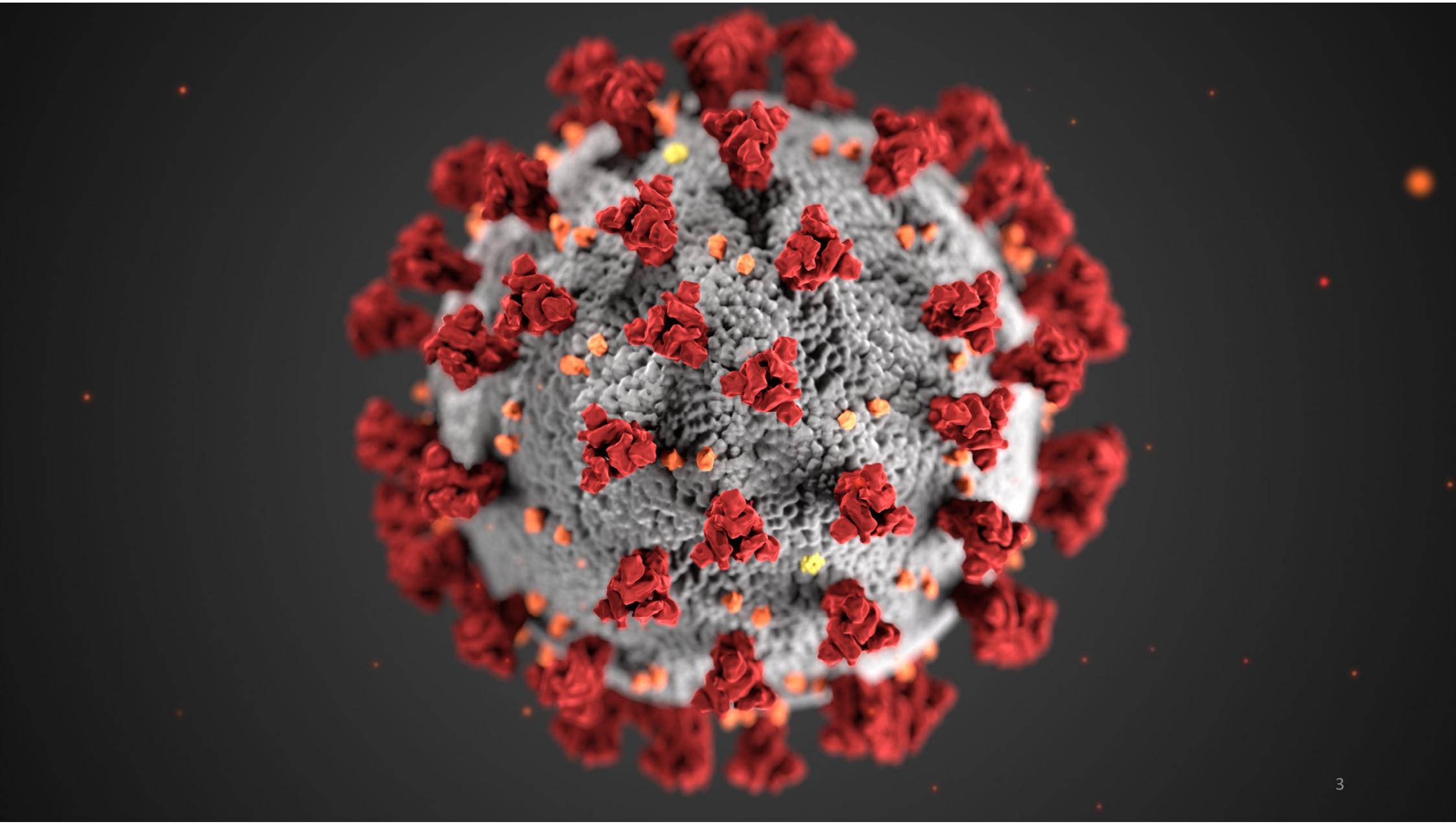
the Design Society
a worldwide community

https://healthsystems.designsociety.org/

Health Systems Design
Hackathon

Balancing and connecting Technology, Human behaviour, Health delivery system

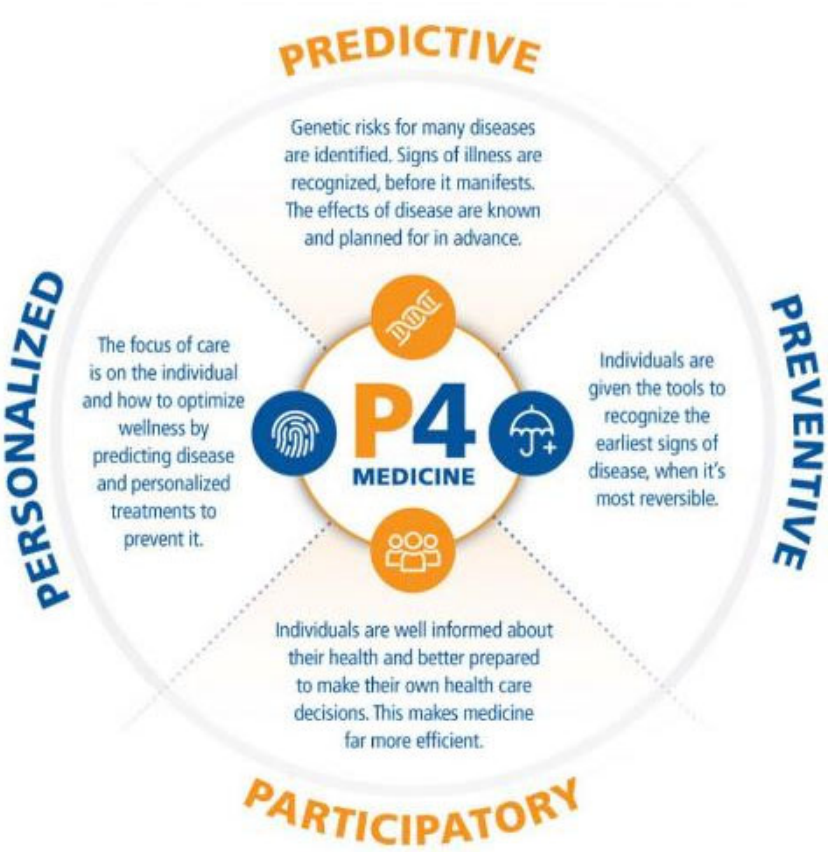
Professor Anja Maier



1 NO POVERTY
7
SUSTAINABLE
DEVELOPMENT
GOALS
3 GOOD HEALTH
AND WELL-BEING
10

Transformative healthcare delivery model

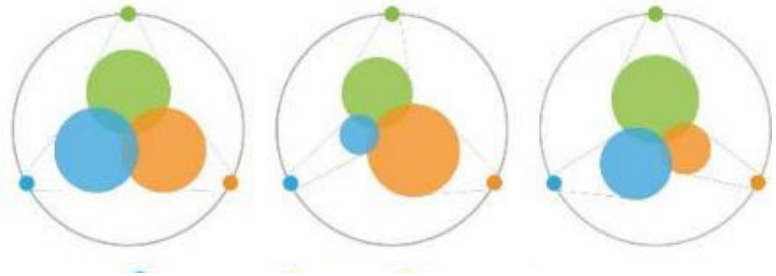
*"[P4 …] arises from the confluence of a **systems** approach to medicine and from the digitalisation of medicine that creates the large **data** sets necessary to deal with the complexities of disease."*
(Hood et al, 2012)

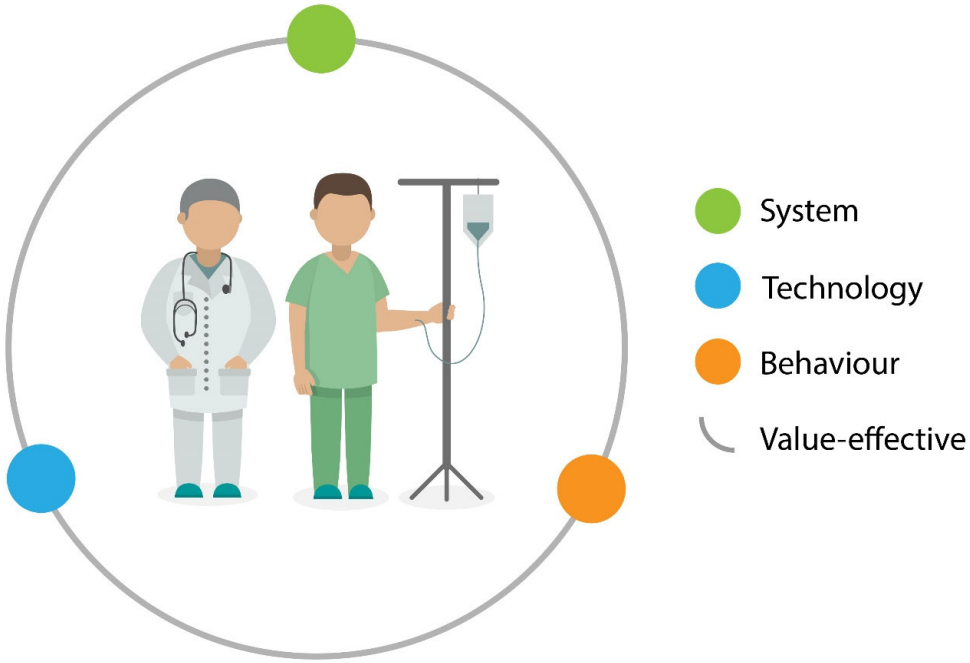


Hood, L., Balling, R., & Auffray, C. (2012). **Revolutionizing medicine in the 21st century through systems approaches.** *Biotechnology Journal*, *7*(8), 992–1001.

François Patou, Nicholas Ciccone, Julia Thorpe & Anja Maier (2020)
Designing P4 healthcare interventions for managing cognitive decline and dementia: where are we at?
Journal of Engineering Design, 31:7, 379-398,
DOI: 10.1080/09544828.2020.1763272

Balancing and connecting technology, behaviour, and the health delivery system





Ciccone, N., Patou, F., & Maier, A. (2019).
Designing for better healthcare: A systemic approach utilising behavioural theory, technology and an understanding of healthcare delivery systems.
22nd International Conference on Engineering Design (ICED19), Design Society.

Designing health futures, research project examples

www.es.man.dtu.dk

Pervasive assistive technology for dementia support and monitoring

VihTek Videncenter for velfærdsteknologi

NATIONALT VIDENSCENTER FOR DEMENS

REGION The Capital Region of Denmark

Wearable technology to explore dementia risk factors: sleep, physical activity, cognitive function

Withings medicineX PEOPLE. TECHNOLOGY. DESIGN.

Listen carefully: Listening effort and cognitive function

EAR SCIENCE Institute Australia

William Demant Fonden

cachet | Copenhagen Center for Health Technology

Gaze tracking to enhance traditional tests of visual field damage in stroke patients

REGION Rigshospitalet

ReHyb: Rehabilitation based on hybrid neuroprosthesis – system architeture, behaviour change, digital twin

REHYB

European Commission

Horizon 2020 European Union funding for Research & Innovation

REACH: Responsive engagement of the elderly promoting activity and customized healthcare

Behavioural design: analysis to intervention to real world impact

CITY OF COPENHAGEN

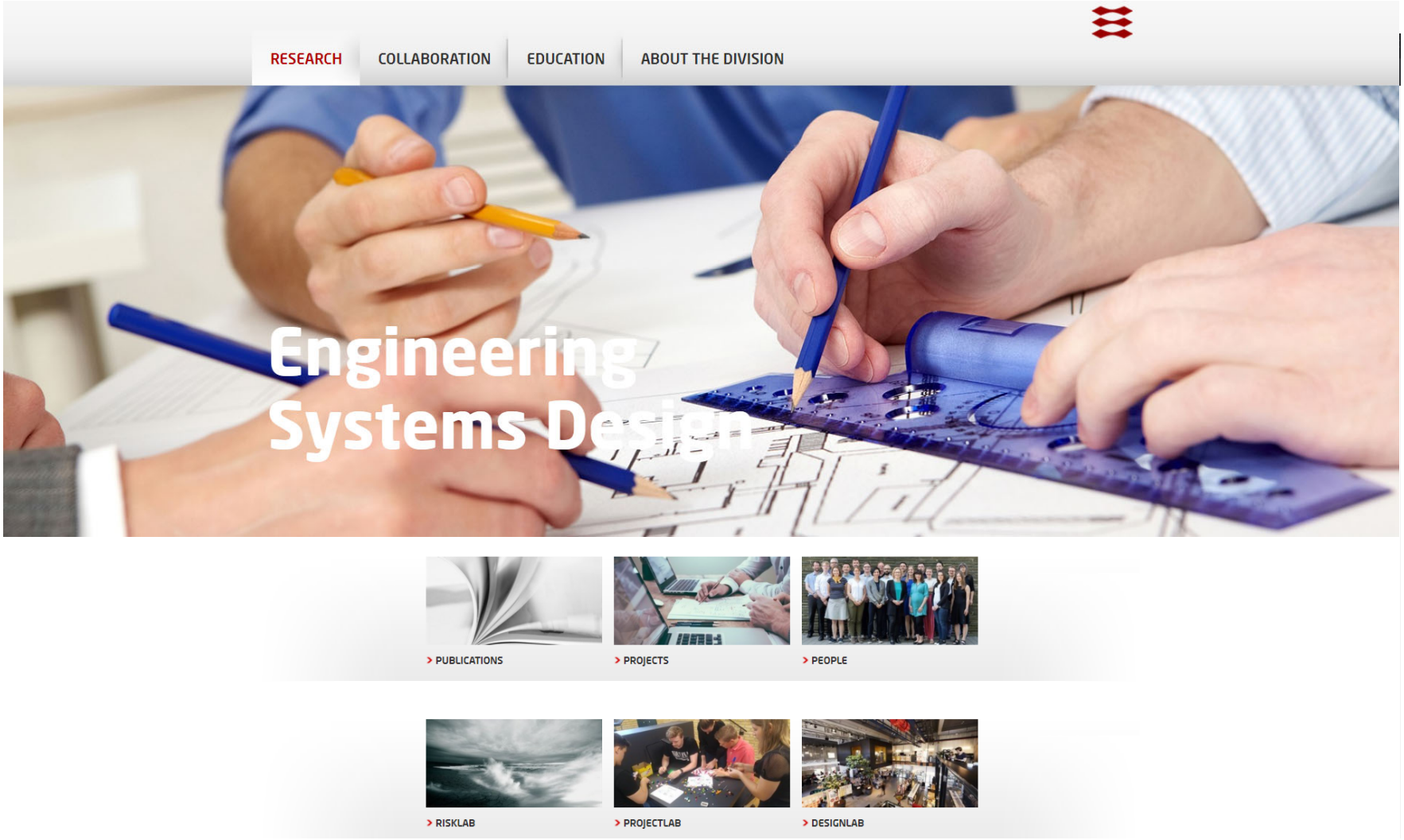
cachet | Copenhagen Center for Health Technology

Behaviour change to prevent spread of infections in nursing homes

helsefonden

cachet | Copenhagen Center for Health Technology

ReHyb@DTU: New technologies for supporting recovering stroke pat...
Watch later
Share
REHYB
https://rehyb.eu/



www.es.man.dtu.dk

Contact

Anja M Maier

Professor, PhD
Engineering Systems Design
DTU-Technical University of Denmark
Department of Technology, Management and Economics
Building 358, Office 187
Akademivej
DK-2800 Kgs. Lyngby

amai@dtu.dk
Tel.: +45 4525 6045
http://tinyurl.com/AnjaMaier-DTU
http://www.es.man.dtu.dk
Designing Engineering Systems

ICED 21
GOTHENBURG 16-20 AUG

the Design Society
a worldwide community

https://healthsystems.designsociety.org/

Health Systems Design
Hackathon

Healthcare Systems Design SIG Workshop
23rd International Conference on Engineering Design (ICED)
Chalmers University of Technology, Gothenburg, Sweden
August 16-23, 2021

UNIVERSITY OF CAMBRIDGE

Systems Approach to Healthcare Improvement

John Clarkson

Professor of Engineering Design, University of Cambridge
Professor of Healthcare Systems, Delft University of Technology

Healthcare Systems Design SIG Co-Director

UNIVERSITY OF CAMBRIDGE

To work with the health and care professions to explore how engineers can add to current understanding and practice of systems engineering in quality improvement and healthcare design

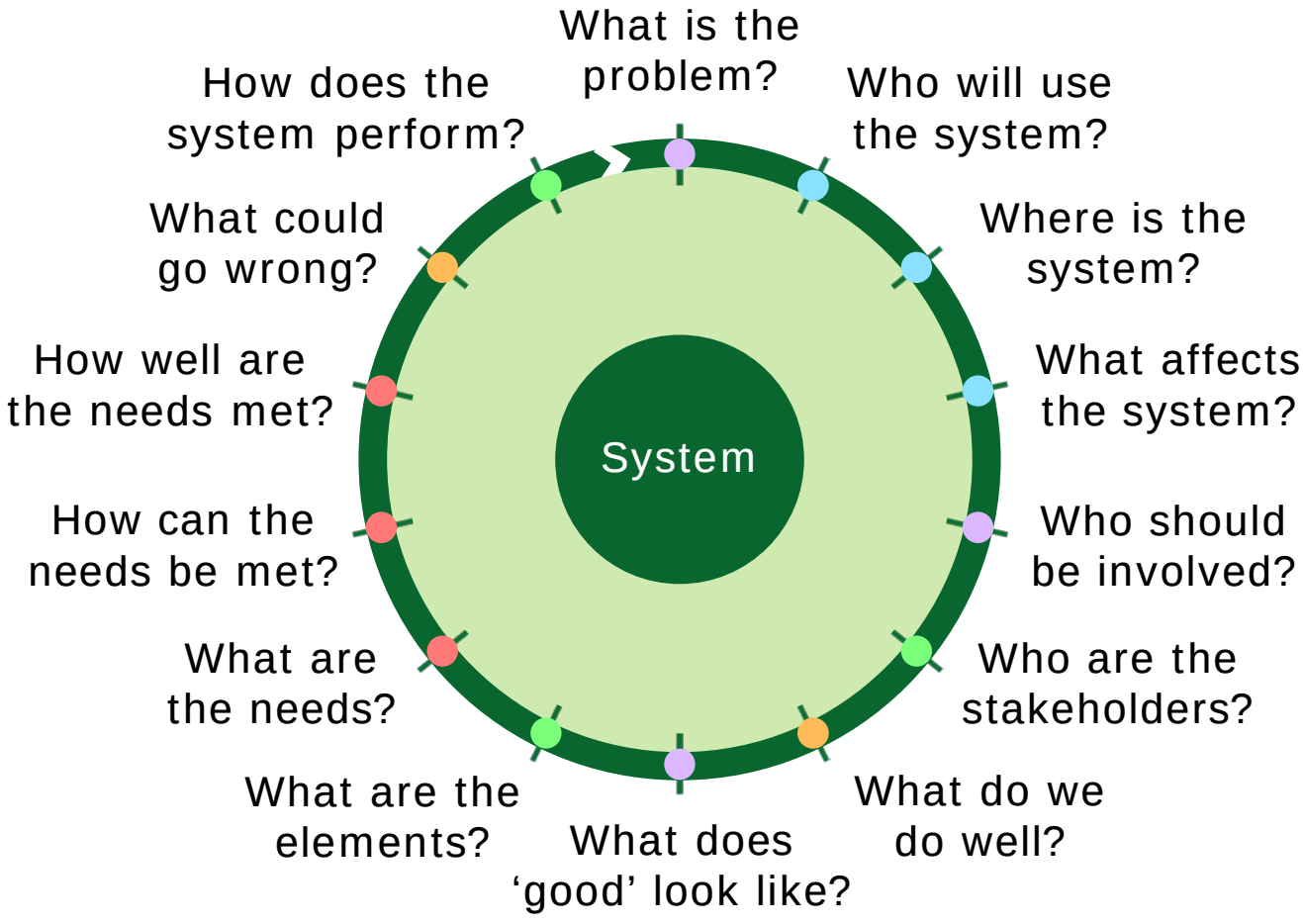
Royal Academy of Engineering

Royal College of Physicians

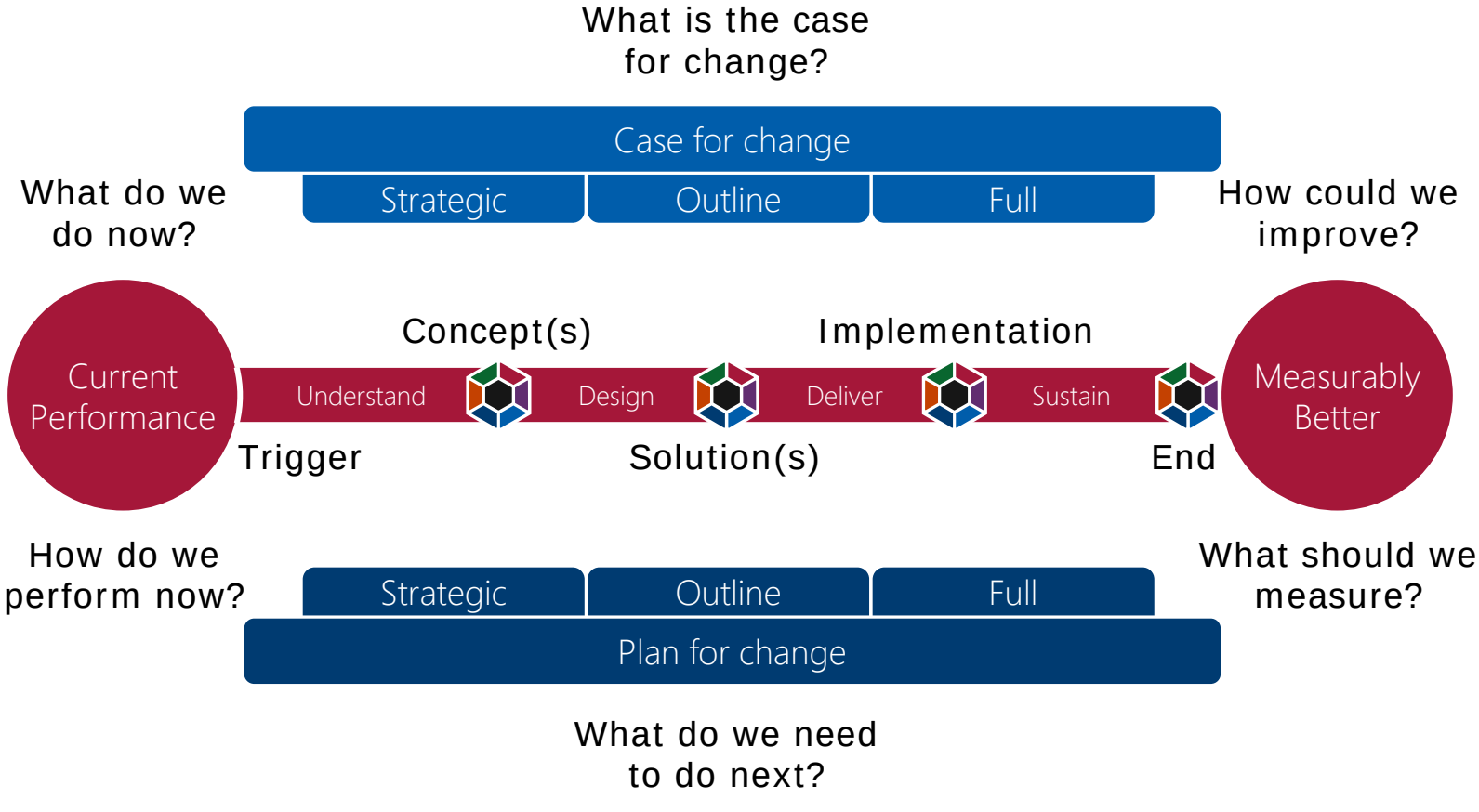
The Academy of Medical Sciences

UNIVERSITY OF CAMBRIDGE

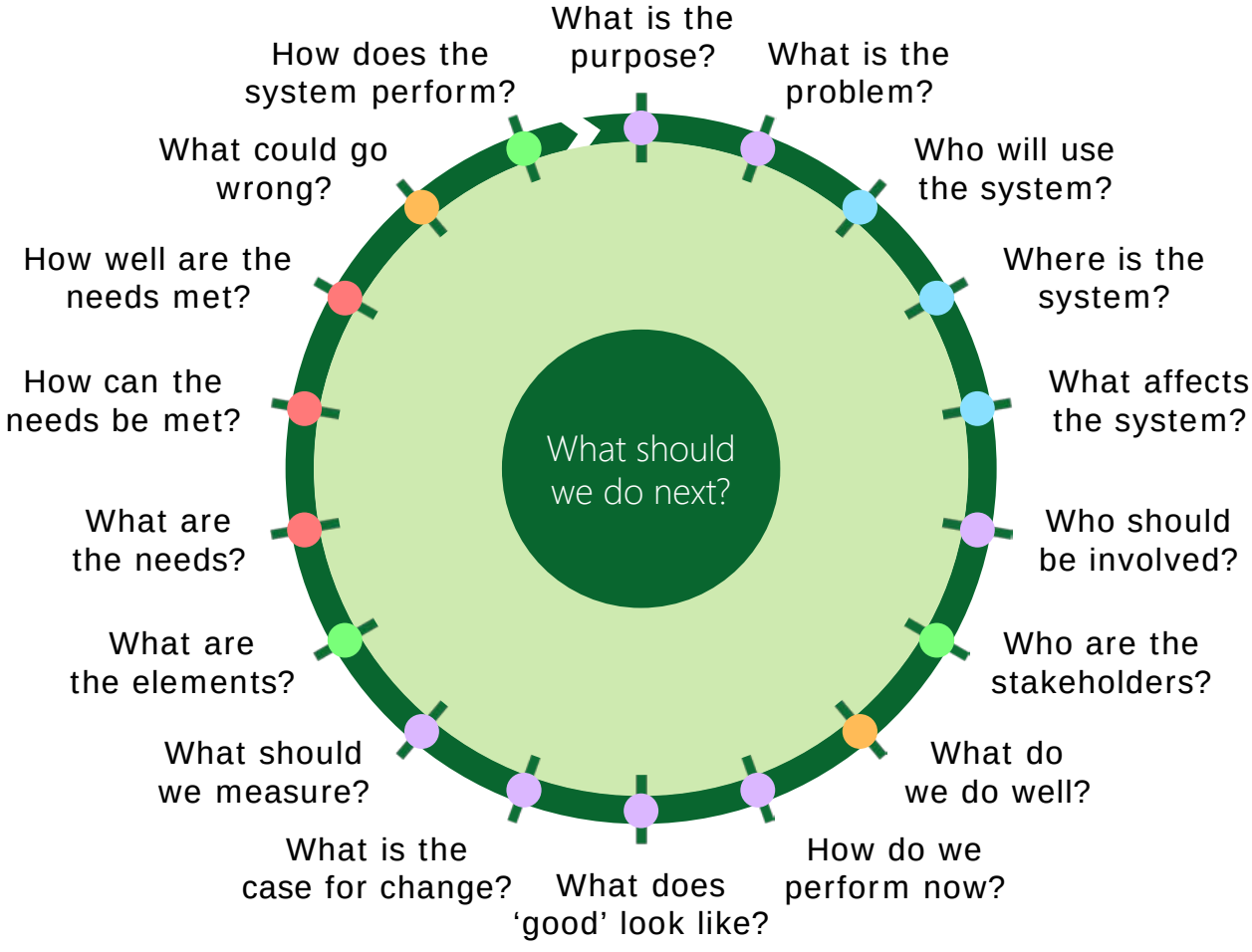
UNIVERSITY OF CAMBRIDGE



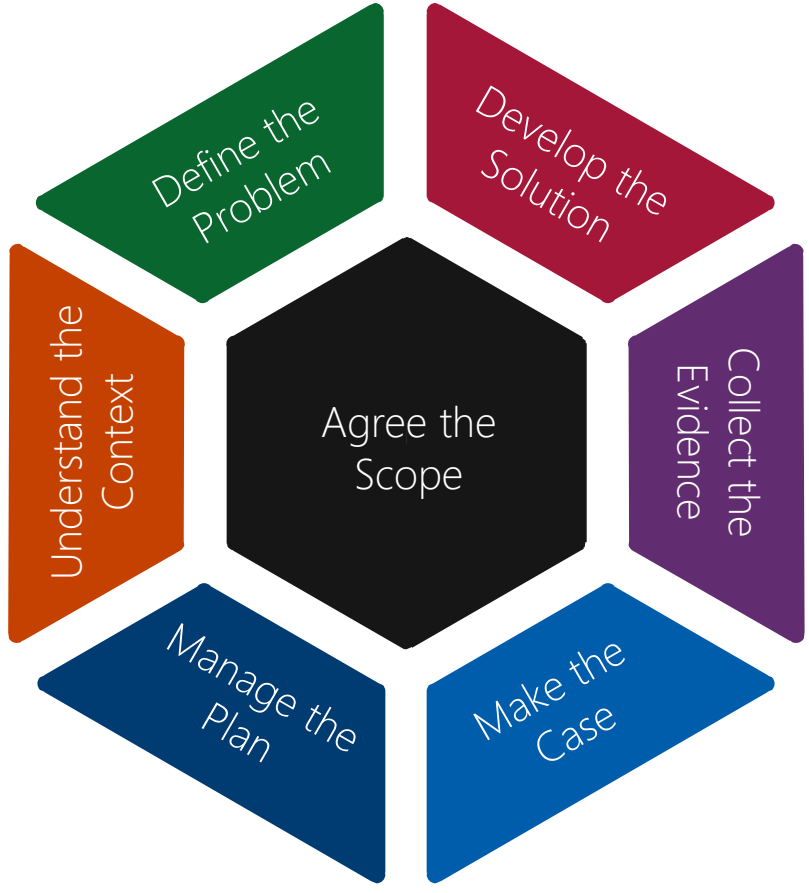
UNIVERSITY OF CAMBRIDGE



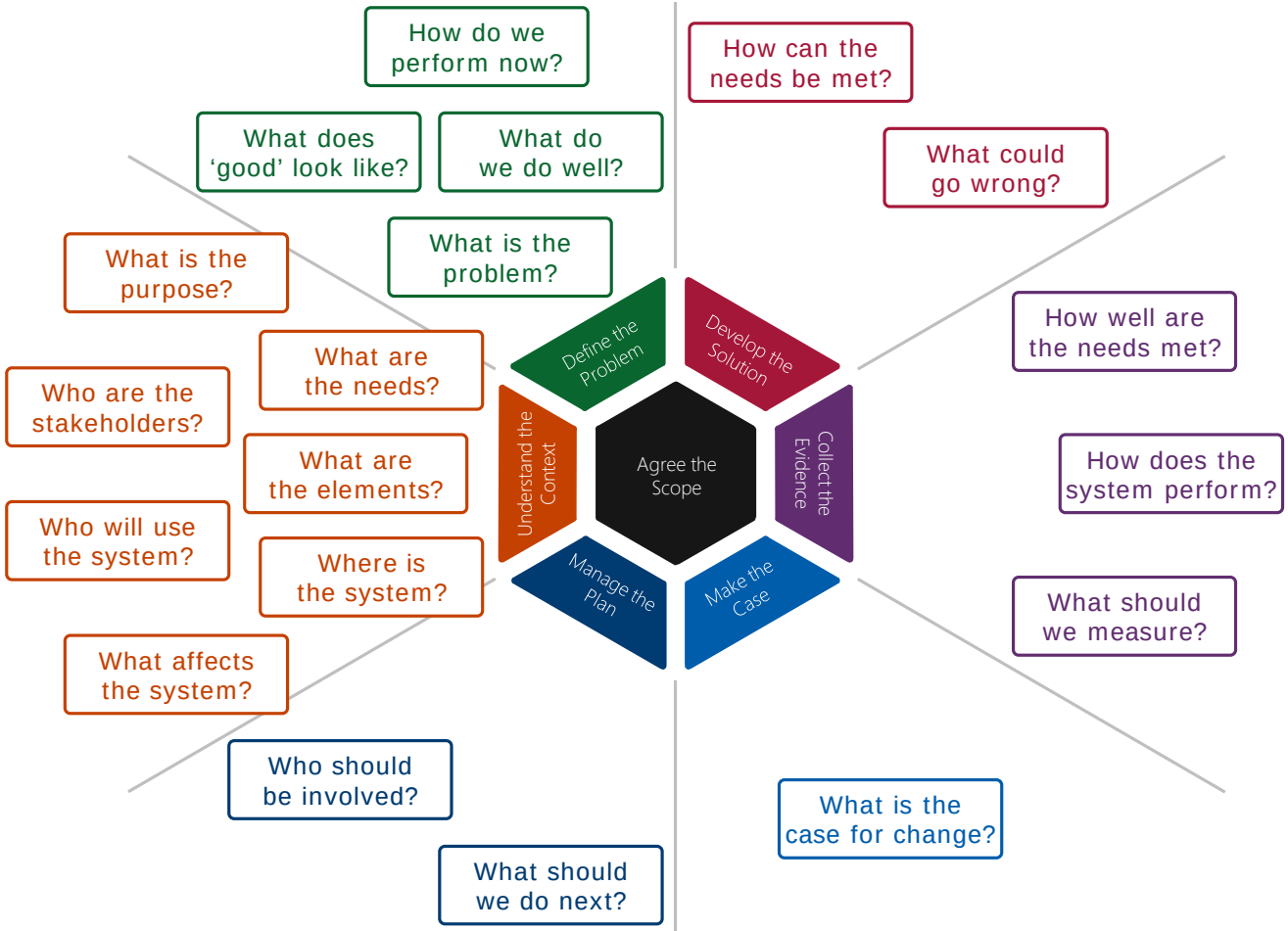
UNIVERSITY OF CAMBRIDGE



UNIVERSITY OF CAMBRIDGE

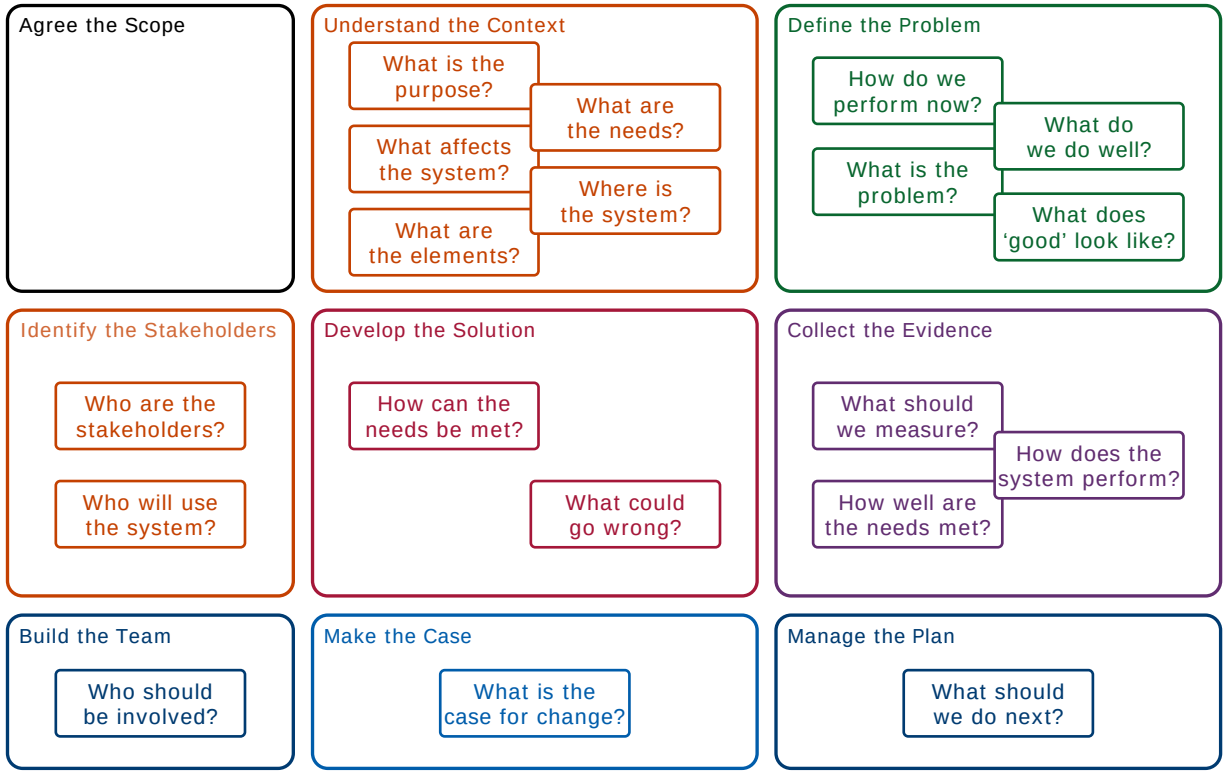


UNIVERSITY OF CAMBRIDGE



UNIVERSITY OF CAMBRIDGE

Improvement Canvas



UNIVERSITY OF CAMBRIDGE

Improvement Canvas

Agree the Scope

Describe the ambition for change and the boundary of the system of interest

Understand the Context

Describe the circumstances and setting of the system of interest and the factors that could influence the improvement/redesign of the system

Define the Problem

Describe the details of a particular challenge(s) within the system and the requirements for change necessary to improve/redesign the system

Identify the Stakeholders

Identify the people who have an interest in any aspect of the system and their needs

Develop the Solution

Describe the idea(s) that will resolve the challenge(s) within the system and the risk(s) associated with changes needed to improve/redesign the system

Collect the Evidence

Describe the information and the measures required to show the effect(s) of the changes proposed to improve/redesign the system

Build the Team

Identify the team who will deliver the project

Make the Case

Prepare an argument(s) to justify the improvement/redesign of the system

Manage the Plan

Create a plan to facilitate the improvement/redesign of the system

UNIVERSITY OF CAMBRIDGE

Resources

- Engineering Better Care

  http://reports.raeng.org.uk/engineering-better-care/cover/

- Improving Improvement

  http://www.iitoolkit.com/

Improvement Canvas

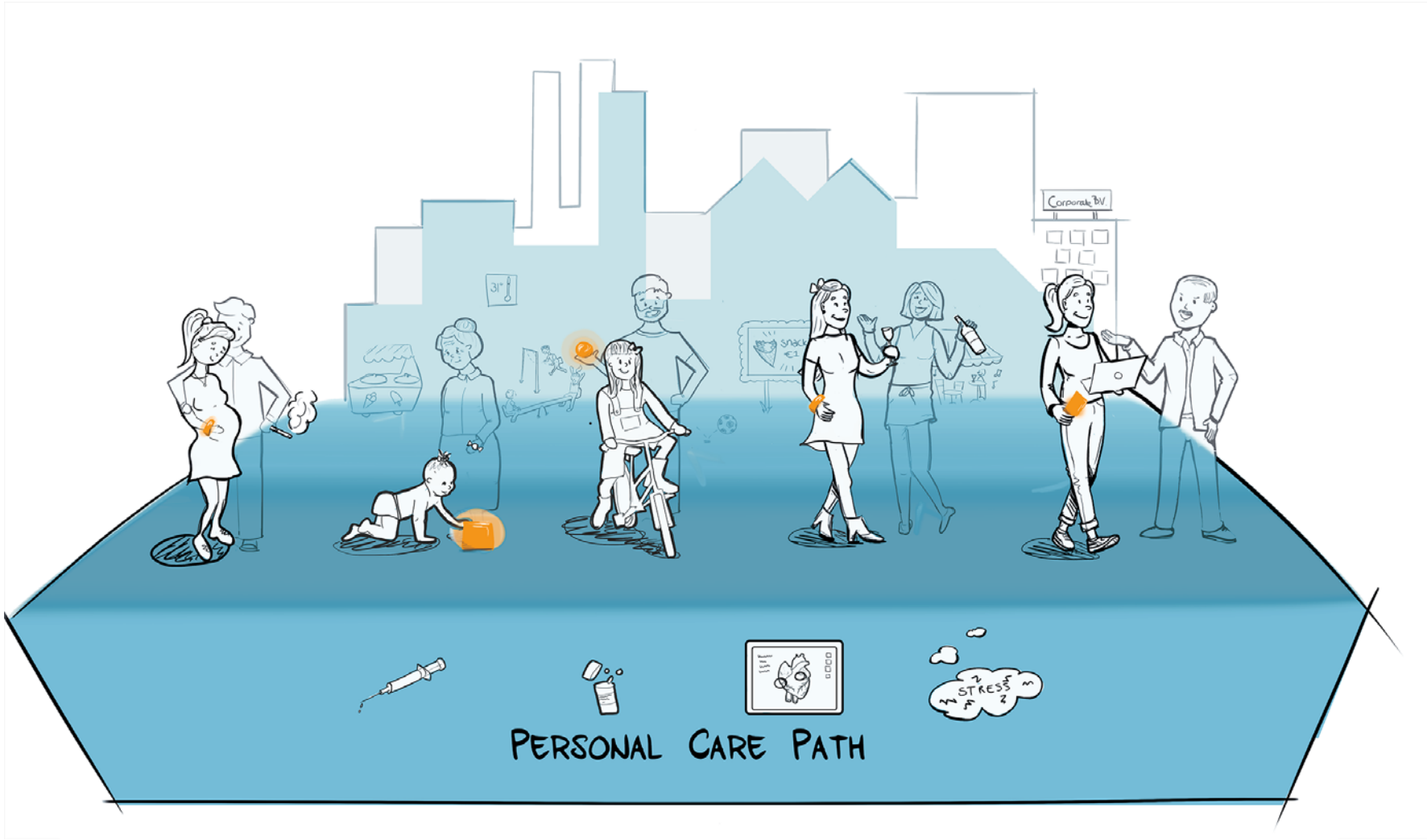
UNIVERSITY OF CAMBRIDGE

Agree the Scope	Understand the Context	Define the Problem
Identify the Stakeholders	Develop the Solution	Collect the Evidence
Build the Team	Make the Case	Manage the Plan

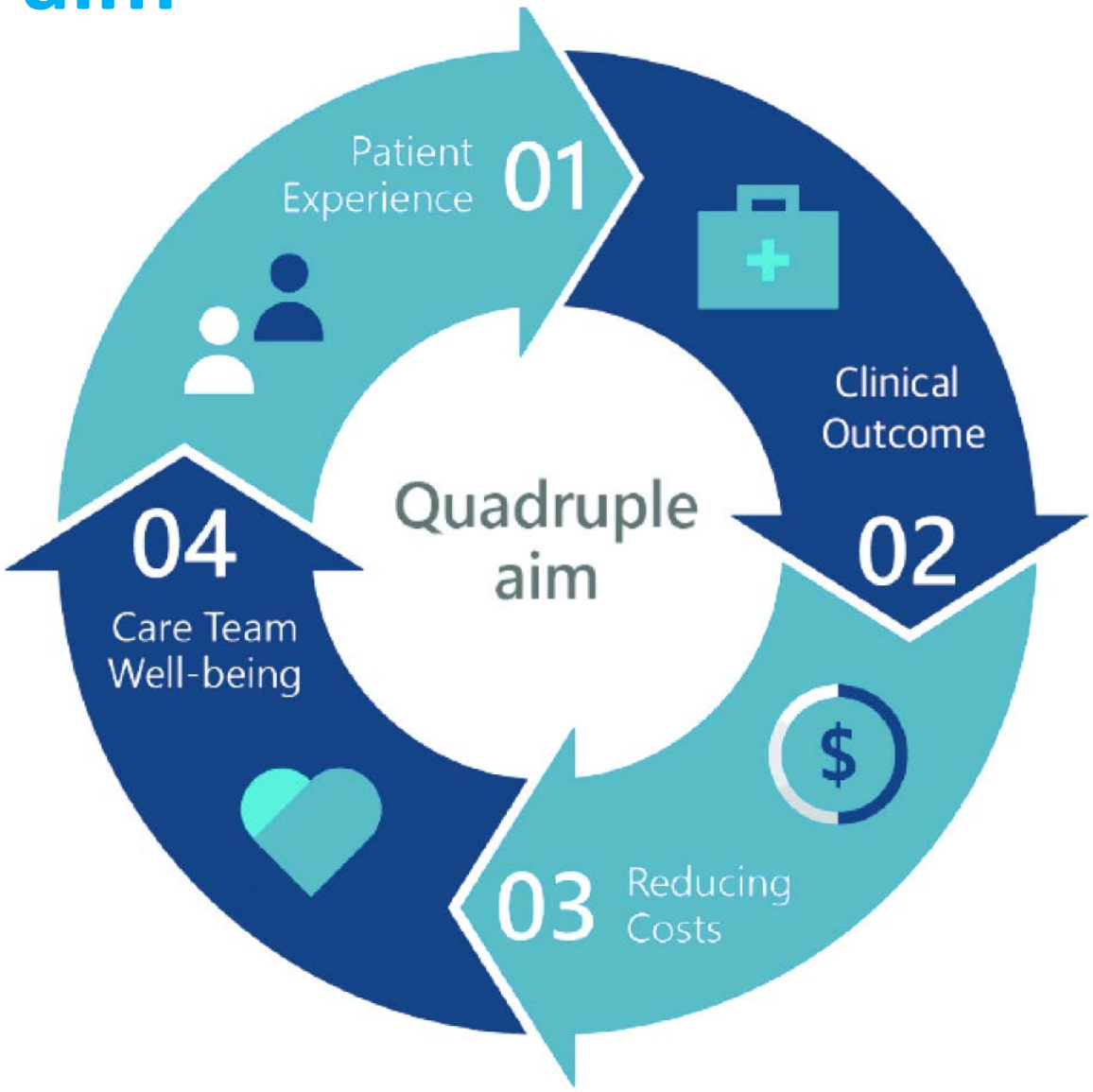
Remote Patient Management Systems as vehicles for system transformation

Maaike Kleinsmann, Valeria Pannunzio, Jos Kraal

Life course approach



Quadruple aim

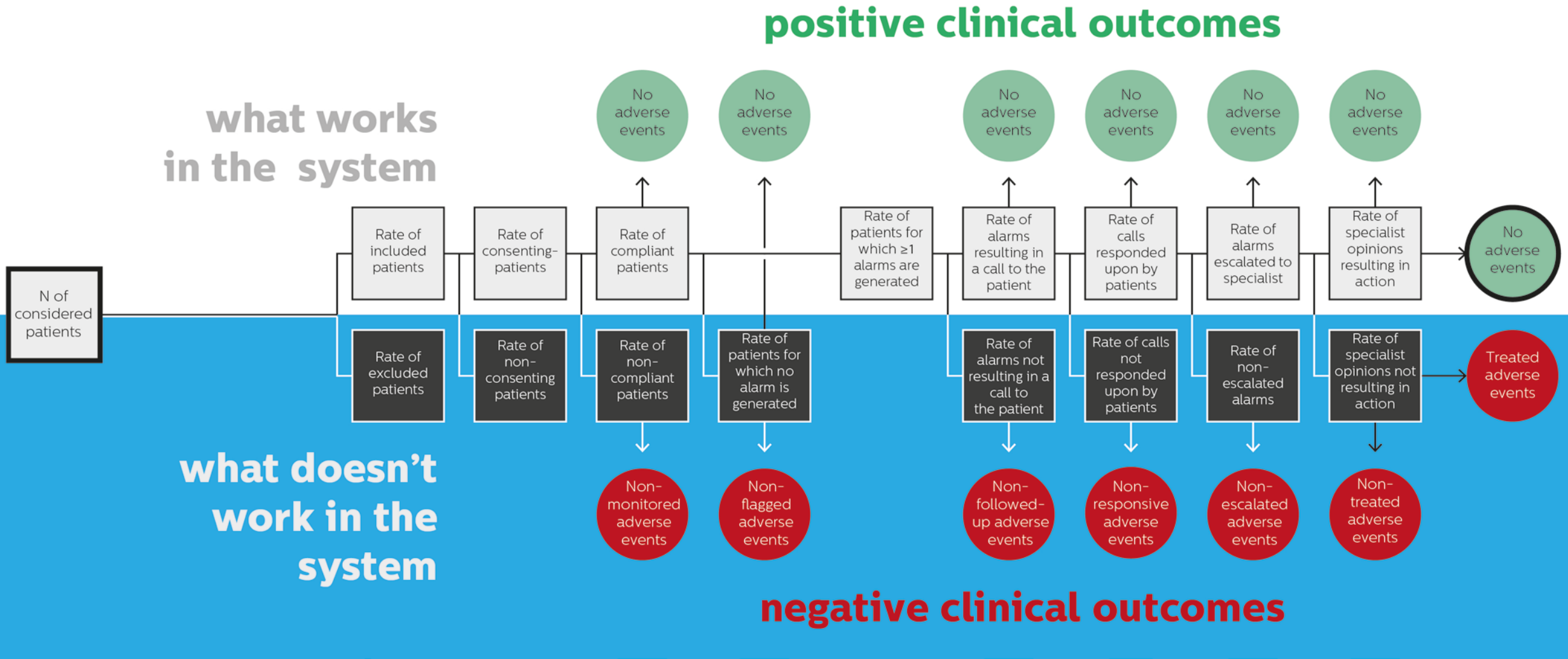


The Perioperative Box

140 patients
55 data points
5 eHealth devices
1.5 years

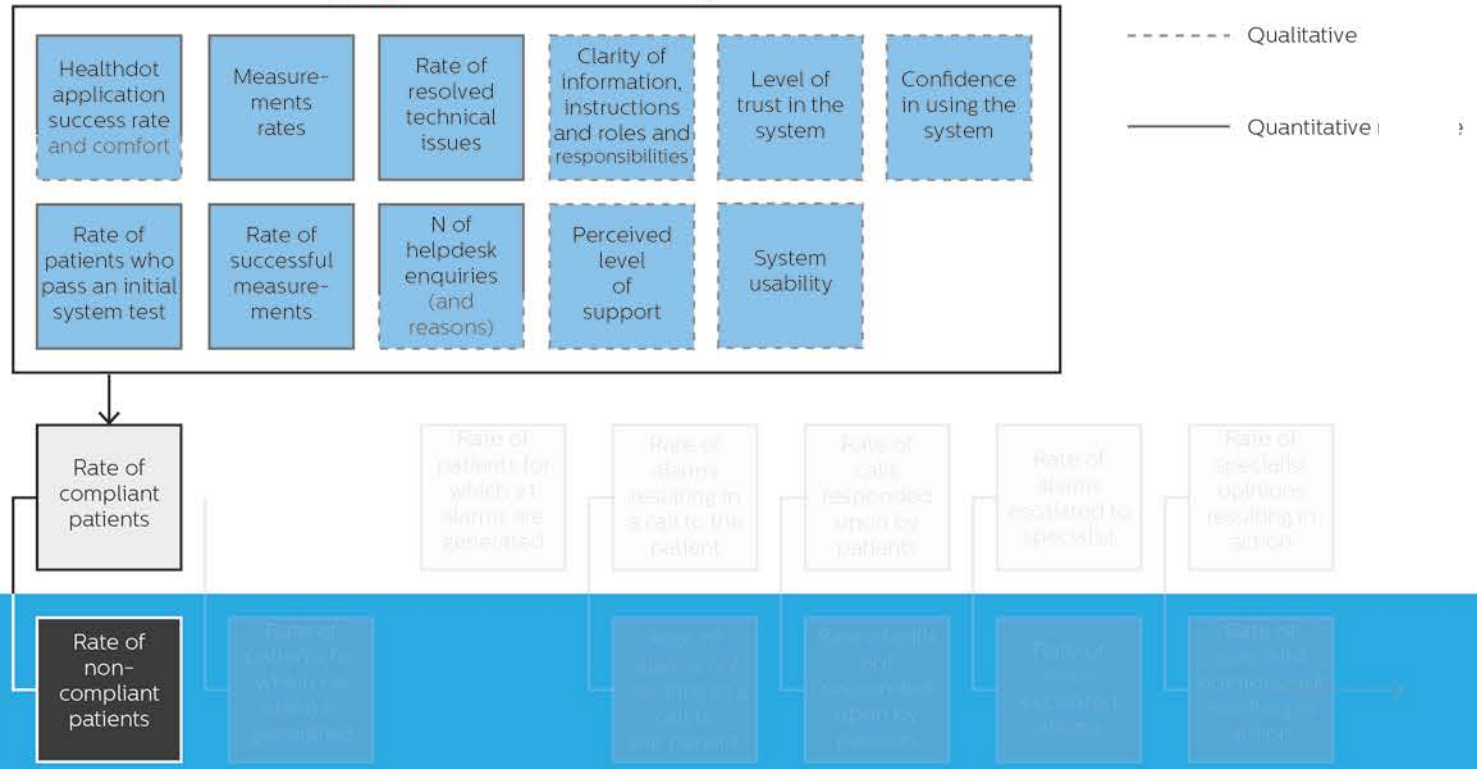
Overall research objective:
investigating whether the Box system leads to improved clinical outcomes (especially in terms of major adverse events and readmissions).

Data strategy



Data strategy

Compliance to self-monitoring protocol: affected by patient experience



AstraZeneca

Challenge

AstraZeneca

ICED Challenges for workshop August 2021

Suggestions from AstraZeneca

DRAFT

July 2021

Not to be distributed outside Conference organization committee

Prevent hospitalisation by self monitoring

Background

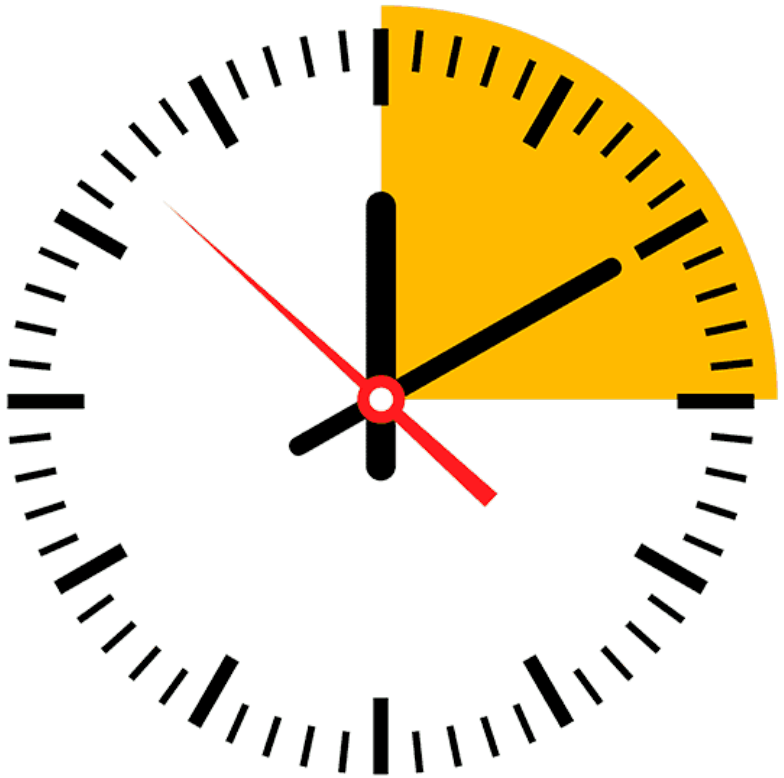
- Chronic diseases often means episodes of more severe disease state (exacerbation/Adverse event) that calls for hospitalisation
- Hospitalisation for chronic diseases is often traumatic for the patients and represent a major cost for the health care system
- A significant degradation of disease state leading to hospitalisation usually follows after several and increasing minor episodes of exacerbation/adverse event that in them self does not lead to hospitalisation
- Prediction of severe episodes based on minor episodes could enable early intervention and reduction of hospitalisation
- Possibility and acceptance among patients for self monitoring vary.

Challenge

- How should a patient monitor be created that flags risks for severe episode?
- How to gain acceptance for monitoring system? Select suitable sub population?
- Narrow: Single disease (Heart failure or COPD)
- Options: Stand alone solution or integrated with health care?

15 Minutes

Break



40 Minutes

Breakout groups & Miro

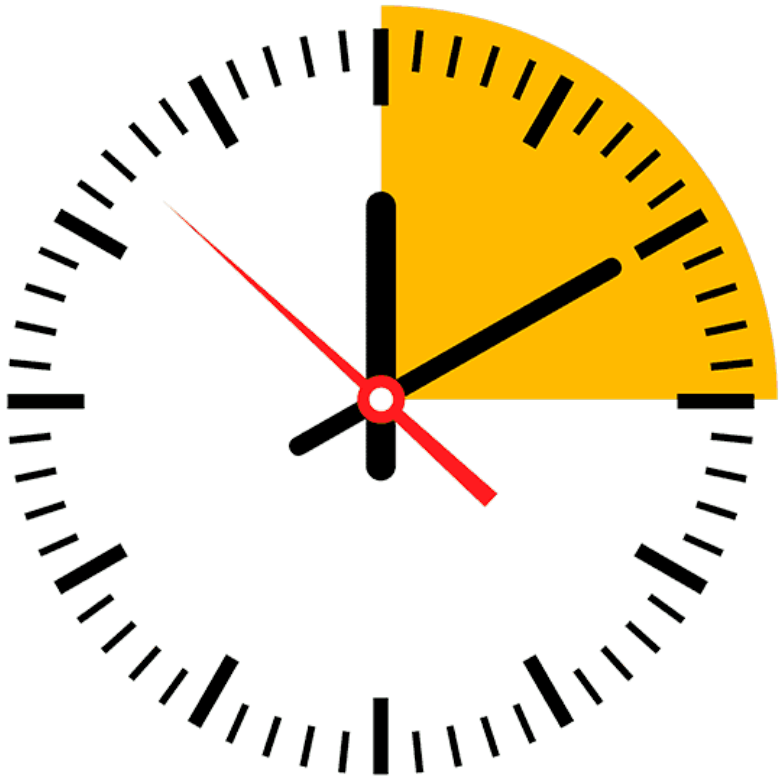
Access your boards faster by installing the Miro app on your device.

Team #Yellow Canvas

Who are you?	What is your proposition?	Why should your propostion be chosen?

15 Minutes

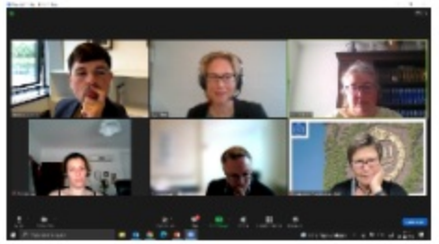
Break



Team #Yellow Canvas

Who are you?

Augmenting and empowering health



Nicholas Ciccone
Claudia Eckert
Andreas Dagman
Ana Amado
Margareta Norell
Anja Maier

What is your proposition?

Technologies

Mapping Barriers

Physical
Mental
Cost
Geographical / Access
Structure health system

Human touchpoints

training in health literacy - technology, data

Health coach, peer help

Personas

Behaviour, Health professionals (formal and informal). children, elderly?

Custom Settings

Ai or Human? Conversational AI?

Machine / deep learning

Ethics? Responsibility of care, where?

Data extraction / sharing

Why should your proposition be chosen?

Augmented health coach

Health coach

Scalable

Community connection

Dynamic

Personable

Appealing to the individual in connection with the surroundings

Co-created by
designers
engineers,
psychologists.
educational designers
computer scientists
lawyers
human stakeholders users along the whole care journey

Lots of intersting design challenges

Team #Green Canvas

Who are you?

Göran

Valeria Pannunzio

What is your proposition?

what is "normal"?

heterogeneous data collection - vital signs + 'soft data' (symptoms, PROMs..)

'Take heart' campaign

heart condition

raising awareness -education

social media

younger audience

focus on the heart, the circulatory system and its characteristics, and the effect of lifestyle on cardiovascular health

different people telling their 'heart stories'

promoting self-monitoring (and self-understanding)

connecting people to existing health system routes if needed

giving personalized insights and actionable advice through (simple) data collection

collecting population-level data on 'non-patients' (possibly useful for population health research and delivery and also to have baseline data in case of future heart issues)

ideal: as passive data collection as possible

what can you measure about heart?

raise awareness - measure pulse, measure BP

what is good for the heart?

Why should your proposition be chosen?

preventive in nature opportunity for large impact

personalized advice/insights

Team #Blue Canvas

TRUST (Trust-driven Remote User System for healTh)

Design of a system that is trusted by its users, and users are/stay committed to use it

Who are you?

Dr A. Komashie

Cambridge

Alex Komashie - Cambridge

Jos Kraal, TU Delft

John Clarkson, 2 hours ago

Jiwon Jung, TU Delft

John Clarkson, 2 hours ago

What is your proposition?

Trust of the system.

Where the data is coming from?

Who provides the service?

Core themes:
1. Trust
2.Confidence
3.Responsibility
4. Security
5. Early warning

Bring people in the black box - transparency

Maintain engagement of patients with the system/proposed solution.

Patients enter life-style information to personalise the predictions from the system.

How to present and communicate information back to the patient?

Timos Kipouros

Simple notification at home, detailed analysis with a specialist.

How the patients will be notified and explained the actions to take to prevent hospitalisation?

Have a transition process adapting to remote monitoring.

Communicate - scenarios - effect of their actions on their disease

Why should your propostion be chosen?

Include knowledge about the construct of Trust from psychology / policy / communication science

System provided by several institutions: combination of government, healthcare, associations

Build trust to the system.

Keep trust in the system

Hide highlighting on changes

Team #Purple Canvas

Who are you?

Meng Li

Alix Feldman

Michael Deininger

Maaike Kleinsmann

What is your proposition?

Integrated system that connects the home to the system

monitoring & action too - else the system cannot prevent hospitalization

RPM should connect the patient and clinician side

Integrated patient log file to manage co-morbidities --> one specialist only sees a part

Knowledge transfer is essential; the patient knows him/herself best -->how to get that knowledge into the consultation room in an effective manner?

Think about the amount of tasks of the patient --> being a patient is not a job --> RPM could support the patient to focus on the right things

Standardization of measurements and usage of medicine for a holistic view of the patients, maybe another overarching institution

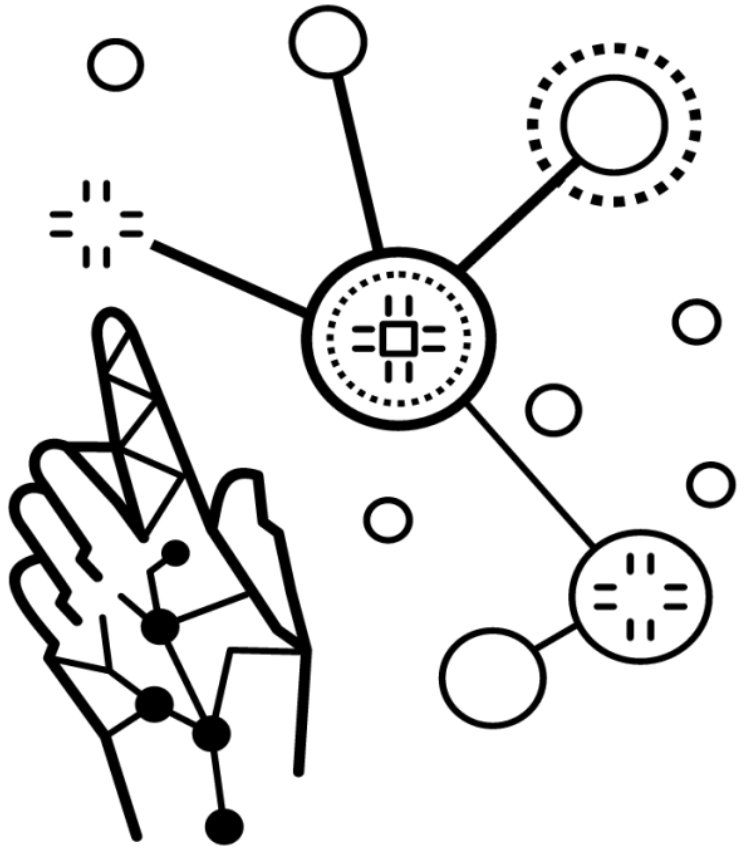
Why should your propostion be chosen?

5 Minutes each + Q&A

Canvas presentations

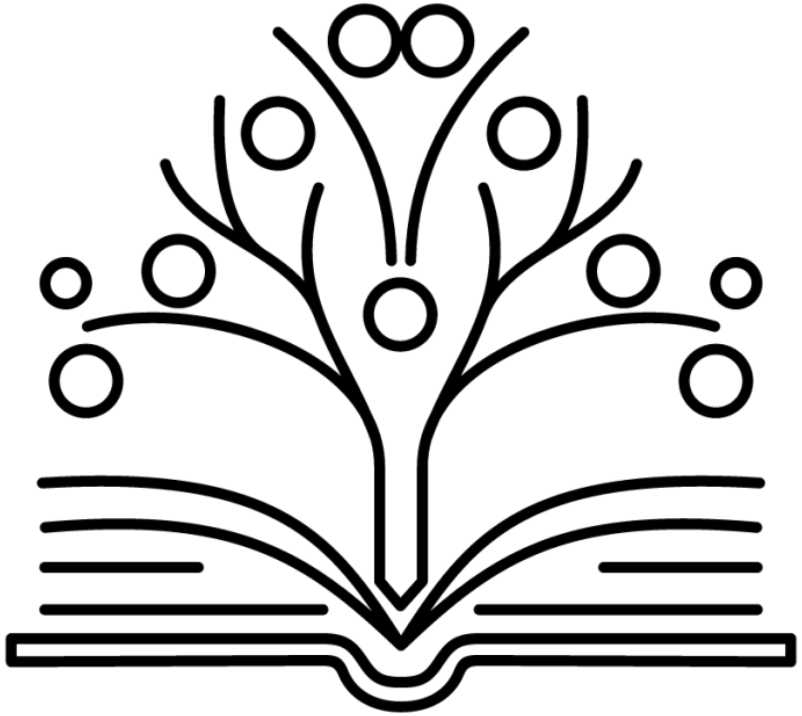
Popular vote, jury vote with Astra Zeneca

Voting



Thoughts of today and forward

Feedback & Next Steps



https://healthsystems.designsociety.org/

Thank you