

# The Future of Technology in Social Care Series

# House Keeping

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- Attendees are on mute and can't be seen
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- On a phone, tap the screen to see the controls – choose More and then **Q&A**
- You will get access to the recording and the presentation (inc links)

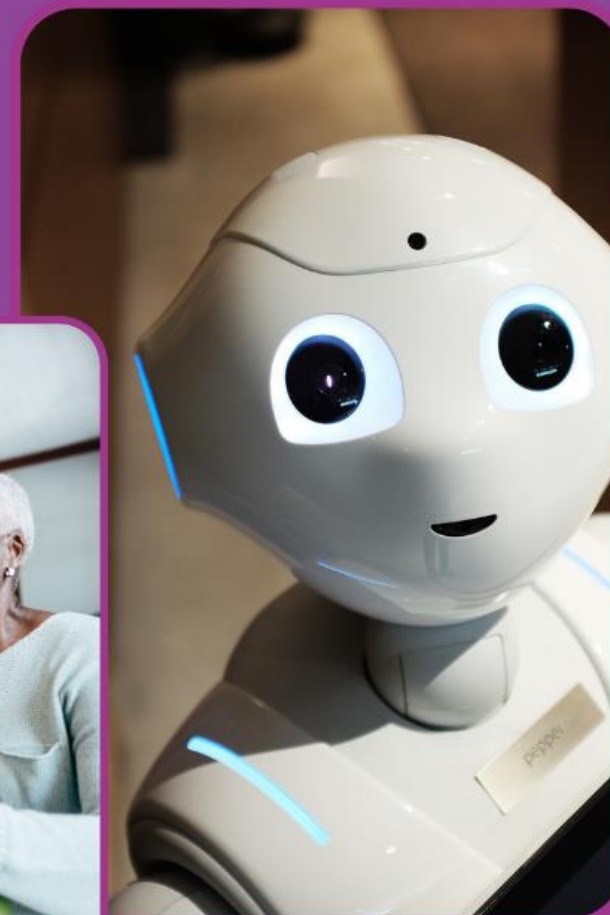
# Agenda

Time	Agenda Item	Speaker
2:00 – 2:05	Welcome and Overview	Professor Vic Rayner OBE
2:05 – 2:25	New and Emerging Technology for Adult Social Care	Jon Glasby, Sarah Parkinson, Lucy Hocking - BRACE Impact Centre
2:25 – 2:45	Live demonstration	Praminda Caleb-Solly, Nottingham University
2:45 – 3:05	Sharing information from the USA	Scott Code, Leading Age, USA
3:05 – 3:25	Q&A session for the panel	All
3:25 – 3:30	Close	Professor Vic Rayner OBE

# The Future of Technology in Social Care Series



- Robotics
  - 12 January 2023, 3 - 4:30pm
- Artificial Intelligence
  - 8 February 2023, 1 - 2:30pm
- Implementation
  - 6 March 2023, 2 - 3:30pm





# New and emerging technology for adult social care

Jon Glasby, Sarah Parkinson and Lucy Hocking  
BRACE Impact Centre

# New and emerging technology for adult social care

The example of home sensors with artificial  
intelligence (AI) technology

## Background and focus of study



Pressures in social care –  
rising demands and  
funding/workforce issues



Technology in the NHS  
and in social care as a  
potential solution

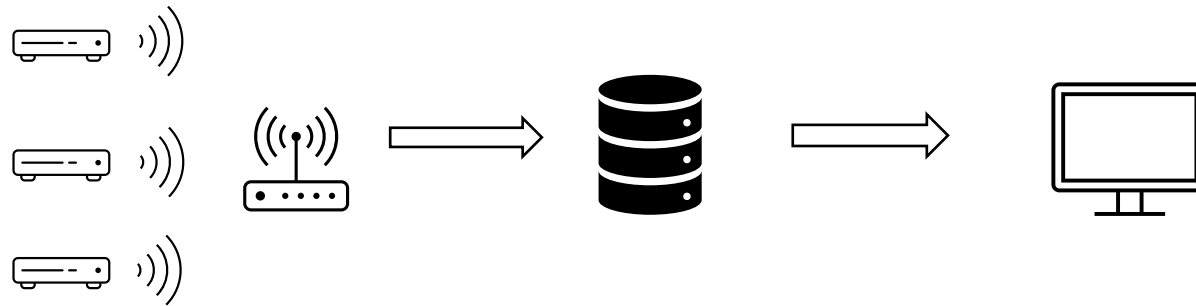


Prioritisation exercise →  
specific home sensor-  
based technology with AI  
capabilities of interest for  
evaluation in social care

Study on '**IndependencePlus**' across three case  
study sites in England. Rather than focus on the kit  
itself, we use it to understand:

- How commissioning decisions are made
- How technology is implemented
- Expected outcomes of technology and  
barriers/facilitators to achieving these goals
- The experience of using technology for staff and  
people drawing on social care services
- The impact of COVID-19 on technology in social  
care
- How the process of implementing technology can  
be improved

## What is IndependencePlus?



Home sensors that collect data (e.g. use of kettle, flushing toilet, opening doors or fridge, bed sensors)

Data accessed via data dashboard by social care staff

AI capabilities to establish baseline for each service user, and provide an indication of increases/decreases from baseline

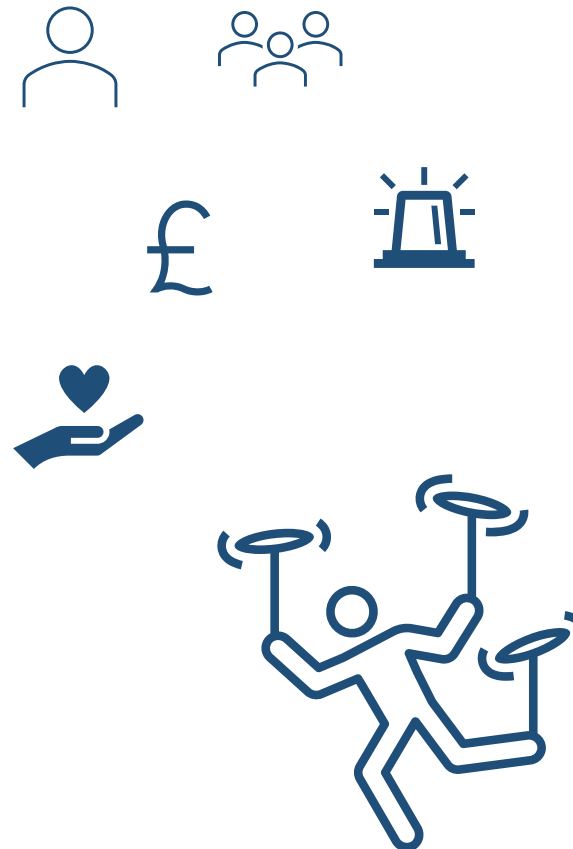


## Methods

- Initial scoping work (literature review and scoping interviews) to inform study design
- Three case study sites across England
- Interviews (n=20) with:
  - Decision makers and operational leads
  - Care staff and care providers
- Interviews with technology providers (n=2) and regulator (n=1)
- Thematic analysis

## Expected benefits: Varying notions of what success would look like

- Understanding needs while care planning (both at individual and population level)
- Supporting independence and providing reassurance that individuals receive appropriate levels of care
- Intervening early in response to signs of decline and preventing further decline
- Responding to emergencies in care (e.g. noticing that someone has fallen and needs assistance) and prioritising tasks for staff



## Decision making and implementation

- Decision making reliant on senior leads - little engagement with care staff or with people drawing on care
- Technology selected prior to identifying main issue that it would address
  - Many different aims that one technology would have difficulty achieving
- Lack of clarity around features of technology and how data would be used:
  - Use of data and ability to analyse and interpret at scale
  - Alerts/alarms
  - Required actions from data
- Technical difficulties with technology that made it difficult to establish baseline and use AI capabilities

## Reflections

Although the technology was relatively unsuccessful, case study sites reported important **lessons learned** from piloting technology:

- Identifying clear gap or need that requires a solution, and then selecting best solution for that issue and population
- Range of expertise and experience needed in commissioning technology and asking the right questions at sales pitches
- Clear picture of how data will be used and what support/resources will be required to use data at scale

*These lessons can help other social care organisations implementing similar technology to **avoid common pitfalls** and ensure that **technology achieves its intended goals.***

# If I knew then what I know now...

## A short guide to introducing new technology in adult social care

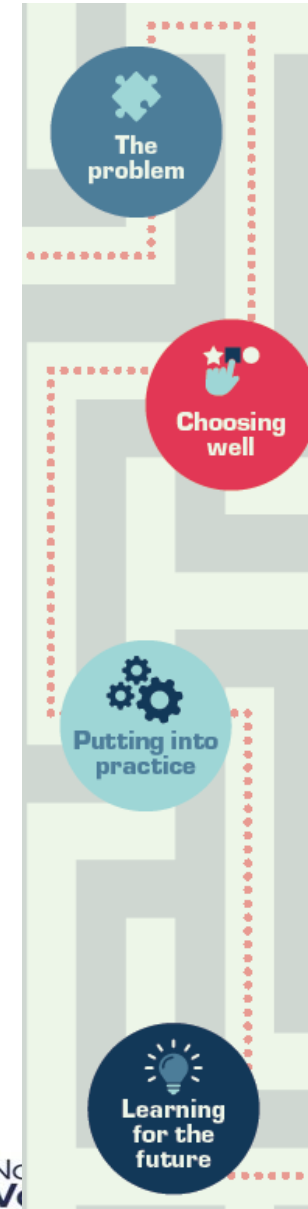
Jon Glasby, Ian Litchfield, Sarah Parkinson, Lucy Hocking, Denise Tanner



UNIVERSITY OF BIRMINGHAM



UNIVERSITY OF CAMBRIDGE





## What problem are you trying to solve?

### The issue

There is a risk that decision makers look to technology to solve many different problems within social care – without always being clear with themselves or each other exactly what they are trying to achieve. Misunderstandings about the purpose of introducing a technology and how it fits into providing care can happen when discussions occur among senior staff only, without the front-line staff, people who draw on care and support, and carers who will actually be using the technology.

- Identifying a problem
- Understanding how technology fits into broader strategies
- Involving care staff and people who draw on care and support, along with their carers, early in process
- Identifying what success might look like and how it can be measured



## Choosing well

### The issue

It can be difficult for decision makers to understand and think through what options are available in terms of technological solutions, how to choose who to work with, what might be possible in practice (or not), and what kind of relationship to develop with technology suppliers.

- Choosing the best technology to meet needs through systematic and transparent process
- Understanding risks and support available from technology provider
- Considering EDI
- Assessing readiness (e.g. digital infrastructure)



## Putting into practice

### The issue

People often think that implementing new technology is about technical issues – but it's also about cultural issues and new ways of working. Sometimes decisions get made by senior leaders (with the best of intentions) who are quite a long way away from front-line practice, leading to practical and cultural barriers when the new technology is implemented.

- Communicating with care staff and people that draw on care
- Training for care staff
- Responsibilities around data management and use of data





## Learning what works and doing things differently in future

### The issue

If decision makers are clear on what they are trying to achieve through using a technology, then you will be able to evaluate whether a technology has succeeded or failed, and learn from this. Sometimes there is pressure to get a new way of working up and running, and evaluation plans aren't always built in from the start. However, it is important to set up evaluation and learning processes, and share learning with others. If something isn't working, it can be surprising, and so it may be helpful to think through in advance how your organisation might respond to challenges and failures.

- Planning for evaluation
- Setting out how organisation will respond to negative experiences or a lack of results
- Planning for the longer term

## Questions and discussion

- *This study/project is funded by the NIHR Health and Social Care Delivery Research (HSDR) Programme (HSDR16/138/31). The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.*
- *For more information about our study, and to read the NIHR Web Report, please see: [New and emerging technology for adult social care: the example of home sensors with artificial intelligence technology - NIHR Funding and Awards](#)*
- *For access to the booklet associated with this study, please see: <https://www.birmingham.ac.uk/documents/college-social-sciences/social-policy/brace/ai-and-social-care-booklet-final-digital-accessible.pdf>*



## Live Demo

Praminda Caleb-Solly

Prof of Embodied Intelligence

Cyber-physical Health and Assistive Robotics Technologies Research Group,  
University of Nottingham



University of  
**Nottingham**  
UK | CHINA | MALAYSIA

A large, glowing blue and green Earth seen from space, centered in the background. The text is overlaid on the Earth.

# The Future of Technology in Social Care Implementing Robotics and AI

Praminda Caleb-Solly  
Prof of Embodied Intelligence



# Cyber-physical Health and Assistive Robotics Technologies (CHART)



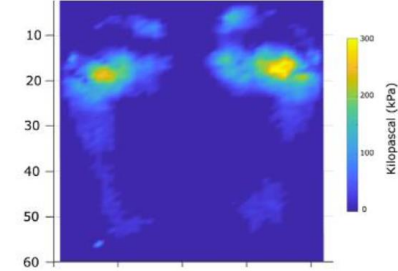
Safety and Benchmarking



User-Centred Design Methods  
and Applications



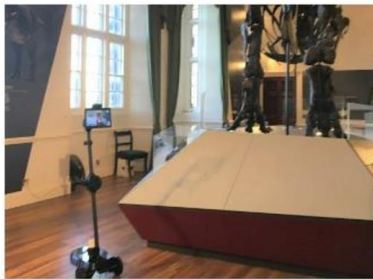
Ethics and Responsible  
Research



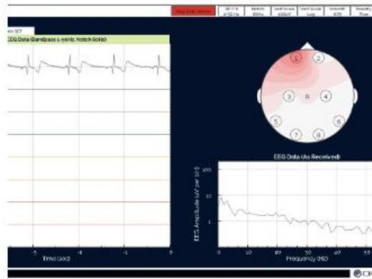
Smart Sensing and Embodied  
Intelligence



Autonomous and Human-  
Guided Manipulation



Telepresence and  
Teleoperation



Accessible Human-Robot  
Interaction and Collaboration



Mobility and Navigation

**CHART are conducting basic and applied research into cyber-physical systems and robotics technologies in health and social care** <https://www.chartresearch.org/>



## Some of our Current Projects

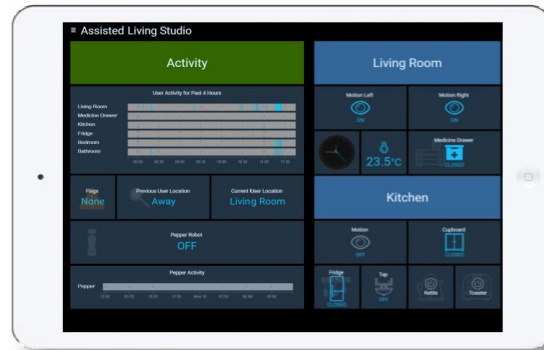
1. EMERGENCE (EPSRC Healthcare Technologies Network+)
2. METRICS (EU H2020 Benchmarking Project)
3. Accessible AI@Nottingham (Alan Turing Institute Network Award)
4. Trailblazers Training Together (BNSSG Age UK Ageing Well Service Development Funding)
5. Empowering the Future Care Workforce: Scoping Capabilities to Leverage Assistive Robotics through Co-Design (TAS Pump Priming project)
6. Digital Twins for Human - Assistive Robot Teams (TAS Agile Pilot)



# Connected Robots – Internet of Robotics Things

Developing assistive robots with contextual intelligence and can learn and adapt to changing user needs

- Leveraging existing smart home technologies and wearables
- Real-time response to sensors linked to a dynamic knowledge base



Fiorini, L., Cavallo, F., Dario, P., Eavis, A. and Caleb-Solly, P., 2017. Unsupervised machine learning for developing personalised behaviour models using activity data. *Sensors*, 17(5), p.1034.

© Praminda Caleb-Solly

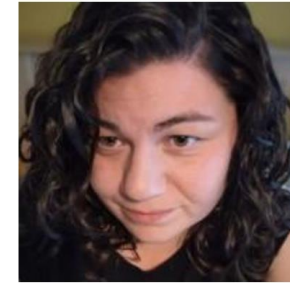


# EMERGENCE

Tackling Frailty - Facilitating the Emergence of Healthcare Robots from Labs into Service

<https://www.emergencerobotics.net/>

Rebekah Moore



Praminda Caleb-Solly



Mark Hawley



Mauro Dragone



Farshid Amirabdollahian Alessandro Di Nuovo

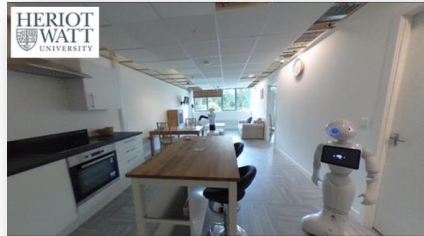




# Network Resources

Bringing together five state of the art robotics testing facilities

Robotic Assisted Living  
Testbed  
@Heriot Watt University

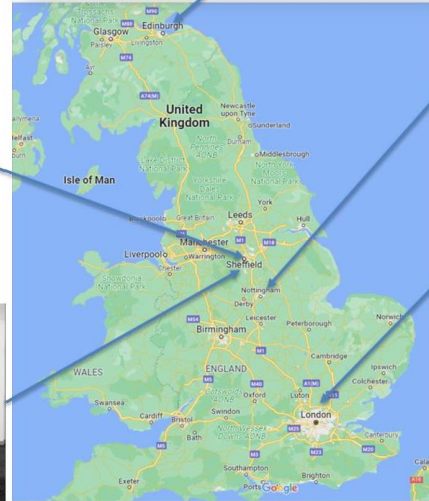


Create.  
Connect.  
Collaborate.



Users normally testing a range of technologies whilst being observed and evaluated by researchers

Advanced Wellbeing Research Centre



Robot House 2.0  
EPSRC infrastructure award

- Develop robot house
- New robots
- Advanced sensors



University of  
Hertfordshire **UH**

## Tackling Frailty

- Frailty is a significant public health problem affecting up to 50% of over-85s (10% of over-65s)
- It has a significant effect on QoL & is associated with falls, delirium, disability, care home/nursing home/hospital admission and death
- It can be mitigated, managed, and even reversed, with the right support, self-management and intervention
- It is a variable condition prone to rapid changes (and thus needs to be tackled using adaptable, intelligent technology)
- Frailty is multi-faceted and therefore solutions could be generalisable to other conditions



## Broad Categories of Intervention – Our three areas of research focus

HCP Management of Frailty

Self-Management of Frailty

Mitigation of Common Manifestations of Frailty

## Common Problems Associated With Frailty

Sarcopenia

Undernutrition

Falls  
Fear of Falls

Reduced Mobility  
Sensory  
Impairments

ADL and IADL  
Difficulties

Exhaustion

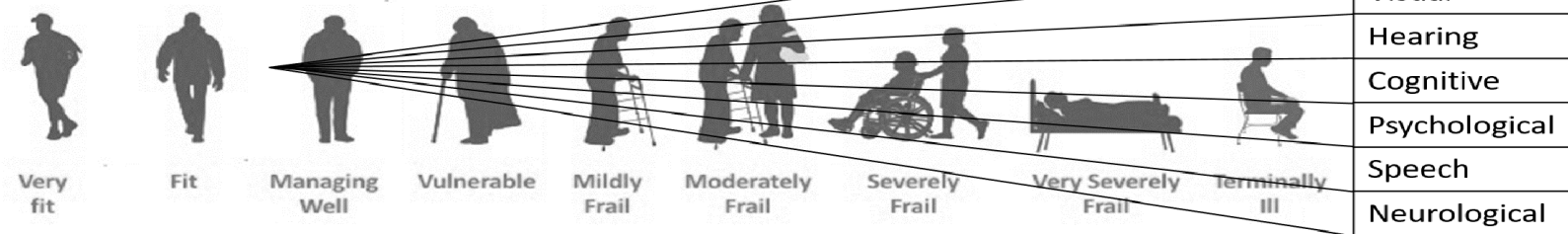
Weight loss

Reduced Strength

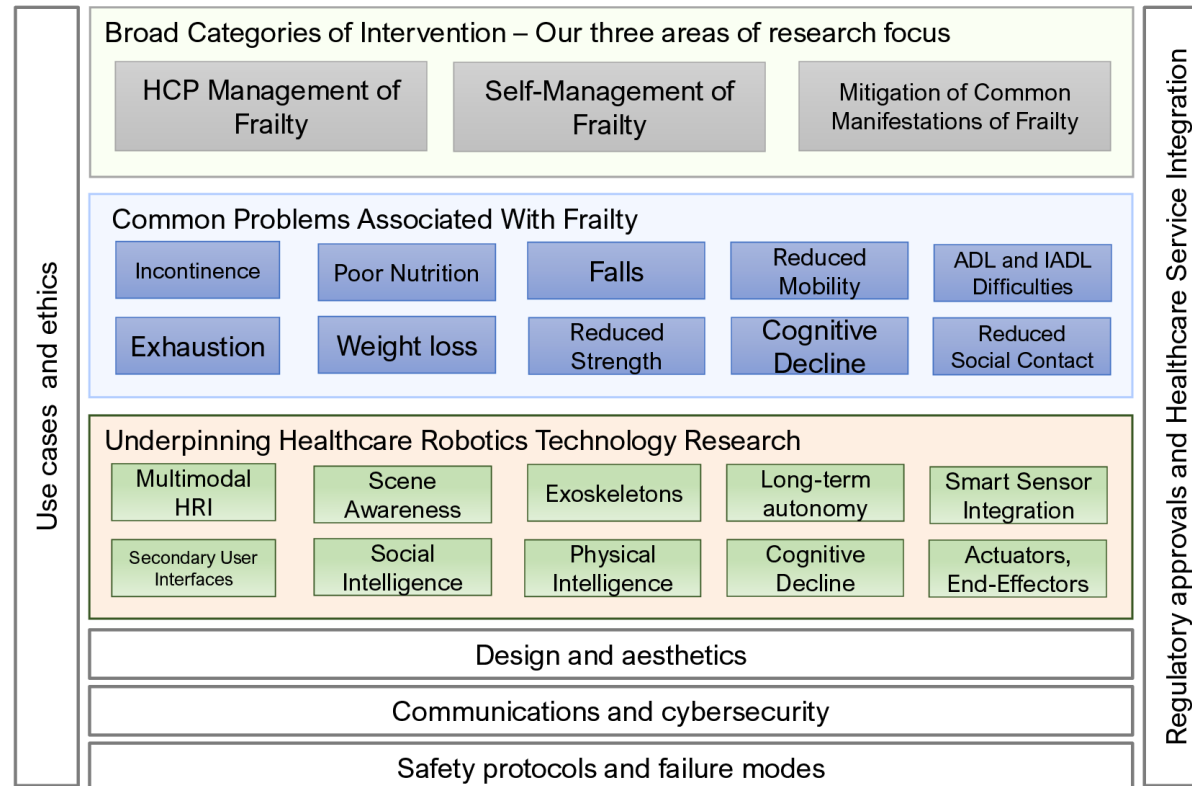
Cognitive Decline  
Anxiety

Reduced  
Social  
Contact

Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, Mitnitski A. [A global clinical measure of fitness and frailty in elderly people](#). *CMAJ*. 2005 Aug 30;173(5):489-95



# EMERGENCE Areas of Interest



# Trailblazers Training Together

## Embedding physical activity in care pathways

<https://www.chartresearch.org/trailblazers-training-together>

# Healthier Together

Improving health and care in Bristol,  
North Somerset and South Gloucestershire



# Why Telepresence?

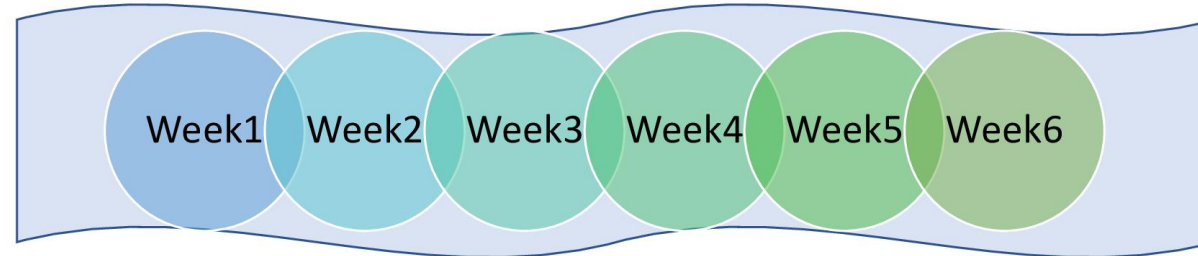
## Problems being addressed in Trailblazers

- Reduced levels of physical activity
- Social isolation
- Increasing hospital admissions/ re-admissions from deconditioning due to lack of inactivity
- Health inequalities in the community
- Lack of volunteers who are able to travel easily



# What is 'Trailblazers Training Together' About?

## Six Week Social Interaction and Exercise Support Programme



Volunteer interacts with the Client using a Telepresence Robot

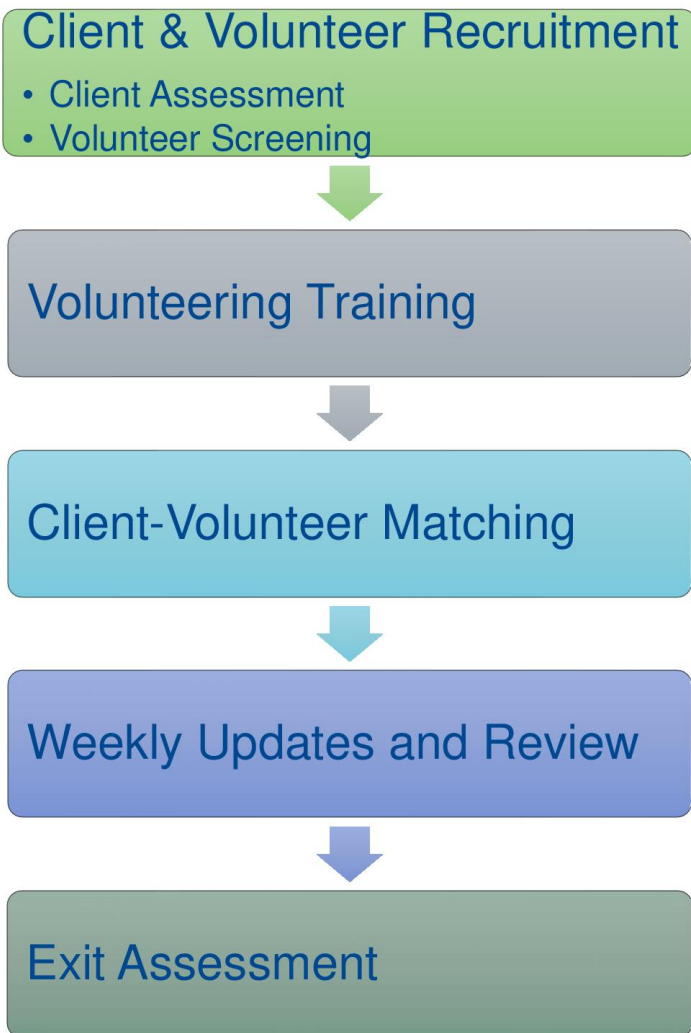


Client Gains Confidence to Start to Participate in Activities Outside the Home

## How does volunteering using a telepresence robot work?



[A Trailblazer Client and Volunteer on a Telepresence Robot](#)  
(image © Brunelcare)





# Project Implementation

**PHASE 1** Partnering with Brunel Care at their Waverley Gardens site and Extracare Charitable Trust at the Stoke Gifford Retirement Village.

- Defined a rigorous process for volunteer selection, recruitment and training
- Set up a framework for running trials with telepresence robots including risk assessment and pre- and post- assessment testing protocols
- Our trials are resulting in a lot of learning in relation to our intended outcomes

**PHASE 2** – Parallel study with a specially developed Alexa App: with and without the telepresence robot volunteer scheme

**PHASE 3** – Working with Age UK Bristol Home Support Team to trial these technologies in the community

# Trailblazers: Outcomes to date

Participants - Volunteers: 22 – 74 yrs old; Clients: 65 – 84 yrs old

## Client outcomes:

- All showed reduced frailty
- Increased levels of physical activity
- Reduced social isolation and better mental wellbeing
- Feeling of greater independence
- Improved digital confidence

## Volunteer outcomes:

- Increased flexibility in terms of location and time that they can volunteer
- Increased knowledge and skills of digital tools
- Gaining training on how to support people with physical activity
- Information to signpost people to opportunities for independent activity at home and in the community

<b>Evaluation Criteria</b>
<b>Grip strength – Dominant hand</b>
<b>Standing speed and ability</b>
<b>Mental Wellbeing ‘I still enjoy the things I used to enjoy’</b>
<b>Social feeling ‘how often to do you feel lack of companionship’</b>
<b>‘How often do you feel isolated’</b>
<b>‘How often do you feel left out’</b>
<b>Delayed recall (memory)</b>
<b>Verbal Fluency</b>



# Being Here

## Telepresence Robots Opening Access to Museums and Connecting Those Most Marginalised

<https://www.hastingscontemporary.org/robot-tours/>



HASTINGS  
CONTEMPORARY

AJA



Robotics for Good  
Smarter Living

SCREEN  
SOUTH



# Why Telepresence?

## Problems being addressed in Being Here

<https://vimeo.com/796214191> and <https://vimeo.com/796215185>

Watch videos about the project on vimeo



- Lack of access to arts and cultural venues
- Physical barriers
- Attitudinal barriers
- Social anxiety
- Fear of prejudice and discrimination
- Lack of support for digital solutions

HASTINGS  
CONTEMPORARY

AJA



Robotics for Good  
Smarter Living

SCREEN  
SOUTH



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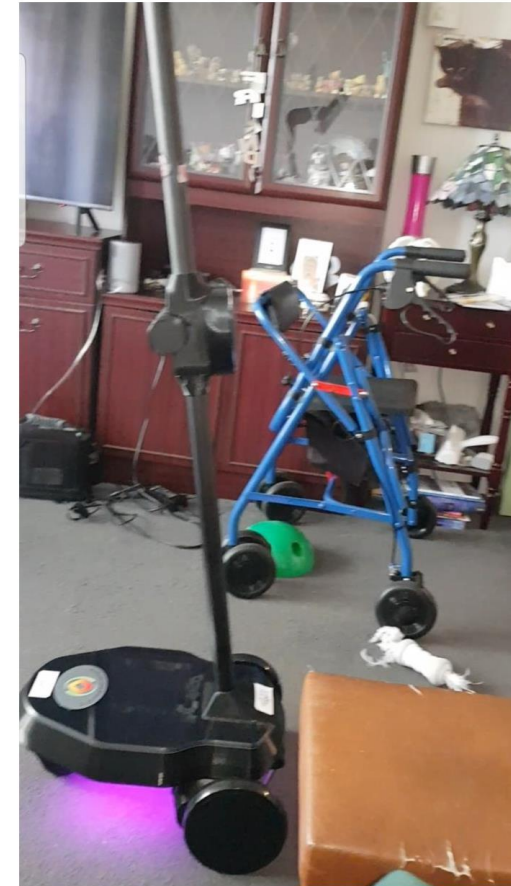
Museums  
Association

## Learning from Project: Challenges and Opportunities

Social	Learning and Response
Anxiety about reduction of in-person visits	Identify people who actually do need much more human-human contact and interaction than they are currently receiving
Can be seen as an imposition and chore	Gain better understanding of the clients' personal issues such as time spent socially isolated or housebound Gain better understanding of staff roles and responsibilities
Anxiety about robots	Focus on purpose and provide evidence of benefit
'Not for me'	Explore alternatives assistive devices

# Learning from Project: Challenges and Opportunities

Logistic	Learning and Response
Training – goes beyond just feeling confident to drive the robot – need skills to interact via the robot	Bespoke training packages ‘Driving and Interaction Training’
Ensuring privacy	Dependent on the integrity of the volunteers
Safety	Remote monitoring of physiological information
Support and Maintenance	On-call service design
Appropriateness of artwork and display setup	Selecting pieces which will benefit from



# Learning from Project: Challenges and Opportunities

Technical	Learning and Response
Lack of high bandwidth and low latency wireless connectivity	Mobile 5G sims – cost is an issue
Old buildings with thick walls	Mesh networks (to some extent)
Ambient noise	Directional microphones and speakers, speech to text
Accessible interfaces	Explore alternative augmentative communication devices
Lack of power sockets	Infrastructure changes
Limited space for docking station and access (obstacles)	Adaptive collision avoidance thresholds

## Further Information:

**If you would like to test drive a telepresence robot  
please contact: <https://www.roboticsforgood.co.uk/>**

Research websites:

<https://www.chartresearch.org/trailblazers-training-together>

<https://www.emergencerobotics.net/>

Praminda Caleb-Solly  
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@praminda on Twitter





## Sharing information from the USA

Scott Code

VP, Center for Aging Services Technologies (CAST)

Leading Age



# Question & Answer Session



Thank you