NIHR | Innovation Observatory

Newcastle University

An overview of technologies to prevent or arrest functional decline or support rehabilitation of functional ability amongst residents in assisted living or care settings.

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Introduction

The UK population is ageing with the number of people aged 65 years and over projected to increase by 49% between 2017 and 2040. Over the same time period, the 85+ population will almost double from 1.4 to 2.7 million (Age UK, 2019). Approximately one in seven people aged 65 to 69 years old and one in three individuals aged 85 years and over experience difficulty with one or more activities of daily living (Age UK, 2019). This means they are unable to care for themselves without support. For example, they may need help with eating, bathing or moving around (Edemekong et al., 2020). As this population continues to grow, the need for support within and outwith care homes will increase. To address this need, the Framework for Enhanced Health in Care Homes (2020), part of the NHS Long-Term Plan (2018), aims to implement evidence-based interventions to improve the efficiency and safety of care for older persons (NHS, 2020). Technologies are a particular focus for development.

A charitable partnership between Legal & General and Newcastle City Council has been established to enhance older adult care, including funding for a "new model" care home for up to 25 residents (Legal & General, 2020). This Imagine Series project aims to contribute to the partnership between Legal & General and Newcastle City Council by identifying and exploring technologies that can be embedded within the built environment (including within the building infrastructure, fixtures or fittings) to maintain a 'sense of home' while also supporting:

1) Prevention of functional decline (prevent an increase in need for support from care staff to undertake activities of daily living (ADLs))
2) Rehabilitation towards prior levels of functional ability (a decreasing need for support from assisted living and residential or other care staff to undertake ADLs that are currently unmanageable)

A 'sense of home' has been defined in the literature as "the creation of an environment that is like a home to its residents, instead of a health care facility in which they reside" (Rijnaard et al., 2016). The factors influencing the sense of home amongst care home residents were identified in a systematic review by Rijnaard et al (2016) and included:

1) psychological factors (e.g. preservation of one's habits and values; maintaining control and choices over everyday routines);
2) social factors (having positive interactions and relationships with staff, fellow residents, family, friends and pets) and engaging in meaningful activities; and
3) aspects of the built environment (e.g. having private space; nice outdoor views).

This Imagine Series project will be delivered by the NIHR-funded Innovation Observatory (IO), the national medical horizon scanning facility which sits within the Population Health Sciences Institute at Newcastle University. Central activities, core to the remit of the IO, include advanced horizon scanning, methodological research and meaningful public and patient involvement. To facilitate delivery of the current project, the IO will work collaboratively with key members of Newcastle City Council and colleagues within the Applied Research Collaboration North East and North Cumbria (ARC NENC) multimorbidity, ageing and frailty theme, who conduct applied health and social care research with a vision to achieve "better, fairer health and care at all ages and in all places" (ARC NENC, 2021).

The project Steering Group will include Jennifer Liddle, Barbara Hanratty and Katie Brittain from ARC NENC, and Kathryn Williams, Claire Alder and Marta Rzpecki from Newcastle City

Council. The steering group members have expertise in evidence synthesis, gerontology, general practice, service improvement, adult social care and commissioning. Their role will be to provide advice as required, disseminate findings from the project and act upon them as appropriate. Meetings with the steering group will occur monthly throughout the running of the project in an on-line format.

Before starting the project, we will share the protocol more broadly by placing it on the IO website (http://www.io.nihr.ac.uk/), where it will remain free to anyone to access. Once this protocol is approved by the steering group, this Imagine Series project will take 16 weeks to conclude.

Aim and objectives

Our aim is to identify technologies that can be embedded within the built environment, the building infrastructure, fixtures or fittings to: support older people's ability to undertake activities of daily living (such as bathing and moving around) with the minimum of support from care staff; prevent functional decline (prevent increasing need for support from care staff); promote rehabilitation towards previous higher levels of functioning (decreasing need for support from care staff) amongst individuals residing within settings with support, whilst not detracting from their sense of home (Rijnaard et al., 2016).

The objectives are to:

- Conduct a **survey** with members of the public (potential service users) to identify: technologies that are currently in use; unmet need priorities (to feed in to workshop consensus and prioritisation activities); and individuals' additional and prioritised outcomes (to feed in to the evidence maps frameworks).
- Produce an **evidence gap map** illustrating the volume, range and nature of evidence pertaining to health technologies to support prevention of functional decline and/or rehabilitation towards prior levels of functional ability amongst individuals residing within assisted living or care homes. The map will indicate research on technologies aiming to rehabilitate functional ability or prevent functional decline and experiences of using such technologies, their impact on dignity and sense of home.
- Conduct an **Imagine workshop** with potential service users (drawn from the same population as the survey participants) to discuss:
  - Redundancies, gaps and areas of perceived unmet need within the research and innovation landscape indicated by the evidence maps.
  - The potential impact on outcomes of interest identified via the stakeholder survey, of divergent health technologies and opportunities for innovation.
- Use **horizon scanning** techniques to identify technologies ready to market, focussing upon service users' unmet need, innovation gaps and the impacts of the technologies on outcomes identified in the stakeholder survey.
- **Disseminate** results to outline the available and emergent technologies that fulfil unmet and innovation needs. Highlight findings to key opinion leaders from health care and industry in order to drive innovative solutions based upon the service users' insights gathered.

Methods

The Imagine Series is an innovative patient and public knowledge exchange partnership. An overview of the planned project process is outlined in Figure 1, with each component of this project discussed in more detail in the sub-sections, below.
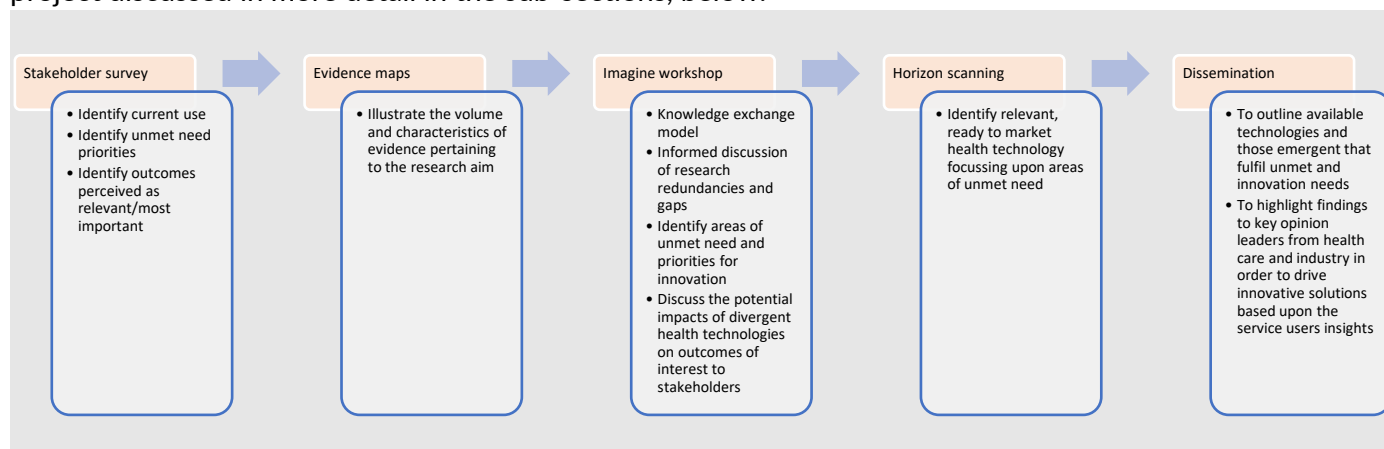

Figure 1: Key stages of this Imagine Series project

This project will use the framework-guided rapid analysis approach described by Gale and colleagues (Gale et al. 2019), with deliberative dialogue (Boyko et al. 2012) as the underpinning framework. Deliberative dialogue is a well-documented and commonly used framework to build capacity amongst stakeholders for contributing to policy and decision making within healthcare.

During the initial scoping and evidence mapping process, key themes of interest will be developed by stakeholders and researchers based upon the existing "state of play". These key themes will be used in data gathering during the next stage of the process. The evidence maps will be shared with service users ahead of their attendance at an Imagine workshop in order that all participants have the same understanding of where the evidence fits around areas of technology use.

The Imagine workshop will be conducted according to the deliberative dialogue framework, which operates on the principles of "non-attribution", transparency and participant commitment. During these workshops, data will be collected and analysed according to the themes developed at the initial stages before the findings are disseminated to the stakeholders.

Within the overarching framework of deliberative dialogue-guided rapid analysis, each stage of the process follows its own methods, described in further detail below.

Stakeholder survey

The opportunity to take part in the survey will be advertised through the VOICE global platform, the NIHR Innovation Observatory social media channels (Twitter and LinkedIn) and directly emailed to specific relevant contacts (including charities and professional bodies). The full recruitment plan can be found in Appendix 3. The survey will be available for 2-3 weeks before the survey closure date. A snowball sampling approach will be used, with respondents being asked to facilitate connections with other interested parties.

The opportunity will include comprehensive information about the project (introduction, aims and purpose), details to access the survey online and offline, a description of the type of

participants we are looking for responses from, and what level of commitment will be required. The last question in the survey will also include information about the workshop and direct participants completing the survey to an expression of interest form for the Imagine workshops. The expression of interest form will be used to purposefully select a diverse and representative group. The survey will be anonymous, with only basic demographic information collected. However, the expression of interest form for the Imagine workshops will ask survey participants who want to take part for their name and contact details. This information will be subject to data protection under GDPR and only shared with the immediate members of the research team.

The survey will be developed using the Qualtrics online survey tool (Qualtrics 2021) (Appendix 1) and will be distributed as described to identify: technologies that are currently in use; unmet need priorities (to feed in to workshop consensus and prioritisation activities); and individuals' additional and prioritised outcomes in relation to supporting dignity and creating a homely environment (to feed in to the evidence maps frameworks). A basic scoping search has been completed to identify existing research from which to identify potential outcomes for inclusion in the survey.

When the survey closes, we will use Qualtrics to collate the responses. Once collated, they will be reviewed and responses refined by removing any technologies, unmet needs or outcomes:

- that are beyond project scope;
- that are unclear or ill-defined; or
- that are duplications.

Responses will be used to populate the evidence gap map framework, unmet needs and prioritised outcomes will be collated and reviewed for discussion in the Imagine workshop.

Evidence map

An evidence gap map is a tool designed to provide an overview of the existing evidence on a topic and to highlight evidence gaps (Unicef, 2021). An evidence map of quantitative and qualitative research will be produced to illustrate the volume, range and nature of evidence pertaining to health technologies to aid prevention of functional decline and/or rehabilitation of functional ability amongst individuals residing within assisted living or care homes. The map will indicate research on technologies aiming to rehabilitate functional ability or prevent functional decline and experiences of using such technologies, their impact on dignity and sense of home. The settings in which identified technologies have been implemented will also be illustrated. A provisional framework for the evidence map is shown in Appendix 2.

Search strategy

The search strategy will comprise of the following concepts combined using the given Boolean operators:

Assisted living or Residential care AND Technologies AND Activities of Daily Living

Searches of the databases listed below will be implemented to identify relevant studies:

- Ovid MEDLINE®and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions®
- ASSIA (ProQuest)

- Compendex (Elsevier)

We will seek to identify and include primary qualitative, quantitative and mixed methods evidence pertaining to the research question unless it is unfeasible to screen the body of evidence retrieved from searches within the time allocated (nine person days). In this case, we will narrow the scope to only include reviews.

Eligibility Criteria

The eligibility criteria in relation to the Population, Concept and Context (PCC) are as follows:

Population

Persons in residential care, domiciliary care or assisted living. We will include studies involving persons with mild to moderate cognitive decline.

We will exclude studies focusing specifically on individuals with advanced dementia as well as studies where the age group is unclear or the study refers to adults generically (studies indicating that at least 80% of participants are in the target population, will be included).

Concepts

Interventions must have the following features in order to be included in the map:

- Single or multi-functional technologies
- Built-in to the infrastructure of the building, fixtures, fittings or designed for use in-situ
- Used for monitoring/tracking of individuals and their needs or used for tracking/reminding and supporting maintenance of activities of daily living (e.g. washing, changing, toileting, eating, drinking, social interaction)
  - Such as sensors (infra-red, acoustic etc) or video surveillance technologies, unless there impacts on the outcomes of interest is not evaluated
- Aimed at rehabilitation of, or prevention of decline in, functional abilities
  - Such as information technology or virtual reality to improve gait or maintain cognition

The outcomes of interest in the map are those identified as important in the service user survey.

The following initial list, which incorporates factors influencing sense of home from Rijnaard et al. 2016, will be shared to elicit further suggestions:

- Helping to maintain or improve habits and routines
- Giving choice and control to do whatever is wanted
- Helping to feel able to cope
- Helping to feel known and valued as an individual
- Helping to retain or improve independence
- Helping other people understand needs and preferences
- Helping to maintain or improve comfort
- Increasing or maintaining physical or digital privacy
- The impact of the technology on surroundings
- Ability to decide who uses the technology and its data
- How affordable the technology is
- How easy the technology is to use
- Who the technology is used by
- How long it takes to learn to use the technology
- Whether you need another person to help you learn and understand the technology
- How long it takes to use the technology once confident in using it
- Other

Context

We will include studies published from 2010 onwards in high income countries with universal care systems.

We will exclude:

- Interventions for medical care or monitoring of health (e.g. electronic medical records, blood pressure monitors, telehealth services)
- Wearable devices or apps unintegrated with the living environment
- Exoskeletons
- Software alone, e.g. development of AI or machine learning algorithms
- Studies with no evaluative component (case reports, small case series <10, feasibility studies, product development studies)
- Studies of technology not in use within care or assisted living setting.

Data selection and coding

Screening of the studies located during the literature searches will be completed using Rayyan software (Ouzzani et al. 2016). Records (titles and abstracts followed by full texts) will be split into batches, each one will be screened by a member of the review team (out of LT, EJ, MS, SG and SJ) and 20% of the records screened by each person will be checked by a second reviewer. Any disagreements in screening decisions will be resolved by discussion if needed, with a third reviewer adjudicating unresolved decisions.

Included studies will be exported to EPPI-Reviewer (EPPI-Centre 2021) for data coding. A data coding form will be piloted in duplicate on 10% of included reviews before a single reviewer extracts the remaining studies. A second reviewer will check these extractions for accuracy, referring to a third reviewer where consensus cannot be reached.

The following will be coded for each included record.

- First author name and year
- Conflicts of interest

- Study funding source
- Country
- Setting
- Study design
- Population (only service users, or service users and other participants)
- Sex
- Number of participants
- Intervention of interest
- Objective
- Technology use
- Outcomes
- Conclusions as reported by study authors

Quality appraisal

The aim of this project is to identify technologies of interest, as opposed to undertaking a scientific evaluation of their effectiveness for improving outcomes of interest. A formalised quality assessment of the evidence will therefore not be undertaken.

Strategy for data synthesis

In order to identify the extent of existing evidence and highlight any evidence gaps, included studies will be mapped to framework domains (Appendix 2). Codes from the data extraction process will be defined and applied so as to create the evidence maps using the EPPI-Mapper wizard (EPPI-Centre 2021). A narrative synthesis will be undertaken to provide a high-level summary regarding the characteristics and conclusions of included studies. This will be structured according to the intervention and outcome categories included in the evidence maps.

Imagine Workshops

Following completion of the survey and evidence synthesis components of the proposal, the researchers will develop a list of evidence redundancies, gaps, indicative unmet needs and technology already in use. Workshops will be run, comprising six people in each session. Expressions of interest will be reviewed by researchers for eligibility, to ensure all applicants are over 55 years of age and have no conflicts of interest.

All eligible participants will be formally invited to the meetings a minimum of four weeks before the first workshop is scheduled. The invitation will include a description of the minimum IT requirements needed and ask participants if accessibility arrangements are required. A 'tech session' will be run prior to the workshops in which those wanting to test connectivity and explore software functionality can do so.

Participants will be provided with an electronic version of the following (hard copies and audio files will be offered and delivered, if required).

- Briefing note that describes the aims and outcomes of the workshop and what will be required of participants.
- Final schedule for the workshop.
- Pre-reading material: the list of technologies in use and areas of unmet need identified by the survey, examples of similar workshops, pre-prepared questions or thought provoking comments, the evidence gap map and an overview of this.

- Housekeeping rules for the sessions and a Zoom (Zoom Video Communications Inc. 2021) user guide flagging how to mute/unmute your microphone, switch video on/off, 'raise hand'/react, send a chat message.

The lead facilitator and co-facilitators (including project researchers and engagement officers) will be identified and briefed in advance of the meeting. Facilitators will include researchers, who will have developed a good overview of the research landscape, and engagement officers, who will guide and manage group discussion, ensuring all participants have an opportunity to contribute.

The workshop will focus on gathering insight prompted by the analysis and interpretation of data collected in earlier components of the project. The data collected from the survey and evidence map will be brought forwards into the workshops. The workshop(s) will take place online and will involve brief introductions of NIHR Innovation Observatory and Newcastle University staff, workshop participants and goals of the project, before moving on to present the data that has been collected from the survey and evidence maps. Participants will then have the opportunity, through several interactive activities and conversations, to explore the information they have been presented with and express their ideas about what they believe to be helpful, invasive, obtrusive as well as discussing which areas they feel that technology would have the potential to make the most impactful improvements in their day-to-day living.

The workshop(s) will be recorded and there will be facilitators on hand to take notes on ideas, opinions and themes that arise during the workshop. Participants will be informed ahead of time that the workshops are being recorded and transcribed, and will have the option of not having video switched on. The automated Zoom (Zoom Video Communications Inc. 2021) transcription facility will be utilised. As far as possible, workshops will be undertaken using Zoom and its integral features: recording, transcription, multiple choice voting, chat, whiteboard, breakout rooms. If deemed necessary, a minimum of the following software (or similar) will be used in addition to Zoom (Zoom Video Communications Inc. 2021) to improve facilitation:

- Visual whiteboards platforms (Stormboard (Stormboard 2021) (allows thread development and voting) MURAL (MURAL 2021), Miro (Miro 2021), Jamboard (Jamboard 2021) etc.).
- Voting, Q&A and evaluation (Vevox (Vevox 2021), Mentimeter (Mentimeter 2021) (hides votes to reduce social normalisation) or Sli.do (Sli.do 2021))
- Online group facilitation (groupmap (Groupmat 2021), teamretro (Teamretro 2021))

Identifying emergent technologies

We will complete a set of horizon scanning searches (see Hines et al. 2019; Oortwijn et al. 2018) for a description of these methods) to identify new and emerging technologies that could fulfil evidence gaps pertaining to areas of unmet needs identified from the workshops. This will be achieved by systematically scanning primary and secondary publicly available sources. These sources of information will include national and international clinical trial registries (e.g. ScanMedicine (NIHR Innovation Observatory)), Regulatory agency sources (e.g. U.S. Food and Drug Administration), publications (including conference outputs), academic institutions and grey literature (e.g. commercial reports, news sources). Combinations of

keywords pertaining to elements of the population, concept and context (PCC) of interest and feedback from the workshops will be used to develop the search strategy and identify relevant information.

Dissemination

A report comprising the survey responses, the evidence map and a list of commissionable interventions will be made available to the steering group and stakeholders. Academic publications will be produced in collaboration with ARC NENC and submitted to relevant journals. A report for funders and industry will be produced in collaboration with the IO Industry programme.

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Acknowledgements and Disclaimers

Appendices

Appendix 1: Draft survey

Imagine: Newcastle City Council

Survey Flow

Q1 Thank you for taking part in this survey.

A charitable partnership between Legal & General and Newcastle City Council has been established to enhance older adult care. The partnership includes funding for a "new model" residential care home with up to 25 beds. We aim to contribute to this partnership, by identifying and assessing the acceptability of technologies aimed at improving older people's abilities to carry out activities of daily living.

By completing this survey, you will be helping us to better understand:

- The ways you use technologies to assist with daily living activities such as cooking
- The things you want technologies to help you do
- The things you feel are important to help understand the positive and negative experiences you have with technology

The survey contains ten questions and should take up to fifteen minutes to complete. Your answers will be combined with those put forward by other survey respondents and used to inform the next part of this project and any follow up projects.

All information collected will be kept confidential and be anonymised before being stored securely by Newcastle University. Information you provide will be shared with members of the project team only. You will not be identifiable in the results or publication of the results. Project findings will be summarised in reports to Newcastle City Council and research, development and innovation funders.

We do not anticipate that filling in of this survey will be a risk for you. Your participation is voluntary and you may choose to leave the study at any time without penalty.

If you have any questions please contact the project team at: nihriovoice@io.nihr.ac.uk

By continuing past this point you are giving informed consent to participate in this survey. You are verifying that you have read the explanation of the study, understand it is voluntary and you agree to participate.

End of Block: Block 1

Start of Block: Block 4

Q2 Are you 18 years of age or over?

○ Yes (1)

○ No (2)

End of Block: Block 4

Start of Block: Block 3

Q3 Which of the following best describes you?

○ Someone not living in a care home or assisted living facility (1)

○ Living in a care home (2)

○ Living in an assisted living facility (3)

○ Family member or carer of someone not living in a care home or assisted living facility (4)

○ Family member or carer of someone living in a care home (5)

○ Family member or carer of someone living in an assisted living facility (6)

○ Other (please describe) (7) _____

Q4 How old are you, your family member or the person that you care for?

○ 18 to 30 (1)

○ 31 to 50 (2)

○ 51 to 64 (3)

○ 65 to 74 (4)

○ 75 to 84 (5)

○ 85+ (6)

Q5 What is your ethnic group?

○ White (1)

○ Black/ African/Caribbean/Black British (2)

○ Asian/Asian British (3)

○ Mixed/Multiple ethnic groups (4)

○ Other ethnic group (5)

End of Block: Block 3

Start of Block: Default Question Block

Q6 Let us know if you, your family member or the person you care for uses technology to help with the following everyday tasks. Click all that apply.

☐ Sleep (1)

☐ Hygiene (e.g. washing or bathing) (2)

☐ Dressing (3)

☐ Movement (e.g. using a stair lift) (4)

☐ Cooking (5)

☐ Eating (6)

☐ Housework (e.g. cleaning, laundry) (7)

☐ Caring (e.g. children, pets) (8)

☐ Entertainment (9)

☐ Socialising (10)

☐ No technology owned to help with daily life (11)

☐ Other technology to help with daily life (please describe) (12)
_____

Q7 How often do you, your family member or the person you care for use technology to help perform the tasks just identified?

○ Every day (1)

○ Every 2 to 3 days (2)

○ Once a week (3)

○ Once every 2 weeks (4)

○ Once a month (5)

○ Not applicable (6)

Q8 If you do not already, would you consider using technology to help you, your family member or the person you care for with any of the following tasks? Tick all that apply.

☐ Sleep (1)

☐ Hygiene (e.g. washing, bathing) (2)

☐ Dressing (3)

☐ Movement (e.g. stair lift) (4)

☐ Cooking (5)

☐ Eating (6)

☐ Housework (e.g. cleaning, laundry) (7)

☐ Caring (e.g. children, pets) (8)

☐ Entertainment (9)

☐ Socialising (10)

☐ I wouldn't want to use technology (11)

☐ Other (please describe) (12) _____

End of Block: Default Question Block

Start of Block: Block 2

✱

Q9 If you, your family member or the person you care for were to use technology to help maintain ability to perform tasks, participate in activities, or prevent accidents, which 3 of the following would be most important?

- ☐ Maintain current ability to socialise and interacting with others (1)

- ☐ Maintain current ability to be entertained (2)

- ☐ Maintain current ability to sleep well (3)

- ☐ Maintain current hygiene levels (e.g. washing or bathing) (4)

- ☐ Maintain current ability to dress (5)

- ☐ Maintain current ability to move around (6)

- ☐ Maintain current ability to cook (7)

- ☐ Maintain current ability to eat without increased help from others (8)

- ☐ Maintain current ability to do housework (e.g. cleaning, laundry) (9)

- ☐ Maintain how homely the current living environment feels (10)

- ☐ Maintain ability to care for others (e.g. children, pets) (15)

- ☐ Maintain ability to carry out activities that give a sense of purpose and meaning to life (16)

- ☐ Maintaining ability to do other tasks or activities (please specify) (14)
  _____

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*

Q10 If you, your family member or the person you care for were to use technology to help prevent accidents, which of the following would be most important?

- Prevent falls (11)

- Prevent injuries (e.g. burns, scalds) (12)

- Prevent the need for further support from others (13)

- Prevent other accidents or incidents (please specify) (14)

_____

Q11 If you, your family member or the person you care for were to use technology to improve or restore the ability to perform tasks or participate in activities, which 3 of the following would be most important?

☐ Improve or restore ability to socialise and interact with others (1)

☐ Improve or restore ability to be entertained (2)

☐ Improve or restore ability to sleep well (3)

☐ Improve or restore ability to maintain levels of hygiene (e.g. washing or bathing) (4)

☐ Improve or restore ability to dress (5)

☐ Improve or restore ability to move around (6)

☐ Improve or restore ability to cook (7)

☐ Improve or restore ability to eat without increased help from others (8)

☐ Improve or restore ability to do housework (e.g. cleaning, laundry) (9)

☐ Improve or restore how homely the current living environment feels (10)

☐ Improve or restore ability to care for others (e.g. children, pets) (13)

☐ ☐ Improve or restore ability to carry out activities that give a sense of purpose and meaning to life (14)

☐ Reduce the amount of further support needed from others (11)

☐ Other (please specify) (12) _____

✳

Q12 If you, your family member or the person you care for were going to use a new technology to help with an everyday task, which 3 of the following would be most important?

☐ Helping to maintain or improve habits and routines (1)

☐ Giving choice and control to do whatever is wanted (19)

☐ Helping to feel able to cope (2)

☐ Helping to feel known and valued as an individual (3)

☐ Helping to retain or improve independence (4)

☐ Helping other people understand needs and preferences (5)

☐ Helping to maintain or improve comfort (7)

☐ Increasing or maintaining physical or digital privacy (10)

☐ The impact of the technology on your surroundings (e.g. fit, look and feel in private or shared spaces) (6)

☐ Ability to decide who uses the technology and its data (11)

☐ How affordable the technology is (12)

☐ How easy the technology is to use (13)

☐ Who the technology is used by (20)

☐ How long it takes to learn to use the technology (15)

☐ Whether you need another person to help you learn and understand how to use the technology (16)

☐ How long it takes to use the technology once confident in using it (17)

☐ Other (please specify) (18) _____

Q13 Are there any other factors that would help you, your family member or individual you care for decide to use a technology to assist with everyday tasks?

_____

Q14 After this survey has closed, we will be organising an online workshop. The workshop will be around 3 hours long and will involve presentations from the project team, Q&A sessions with the project team and large and small group discussions between attendees. The exact dates are to be confirmed but they are expected to take place in December 2021.

Would you be interested in attending the workshop?

○ Yes (1)

○ No (2)

Q15 Thank you for your interest in attending the upcoming workshop. Please provide your details below and a member of the project team will contact you in the near future with further details.

Q16 Please provide your name

_____

Q17 Please provide your email address

_____

Appendix 2: Provisional framework for the evidence gap map, based on scope and preliminary literature searches

The above matrix is an example evidence gap map framework that could be used to collate and provide an overview of the evidence on technologies in the built environment, for prevention and rehabilitation amongst older persons in care settings. To give an overview of the research landscape, records identified from bibliographic searches will be coded according to this framework.

The framework rows have been populated based on technology use/purpose. The parent categories have been drawn from the project scope. The child categories draw upon the more specific purpose of the preventive or rehabilitative technology, focusing on activities of daily living.

The framework columns have been populated based on potential outcomes from use or themes of discussion upon identified technologies; the grouping of these will be further defined by the results of the initial survey and have so far been populated with examples.

The order of the rows and columns will be defined by the results of the survey. Additionally, any outcomes identified by the survey that are relevant and not already captured will be added to the framework.

Appendix 3: Recruitment Strategy

The survey and workshop recruitment will take place through several online platforms. An opportunity to take part will be advertised through the VOICE global platform with a description of the project respondents and commitment required.

Links to the survey or workshop expression of interest will also be publicised on social media (Twitter and LinkedIn), with information about who the opportunities are aimed at and what the goals of the project are. Visibility of the tweet will be increased by '@' ing other related accounts, such as NIHR comms, NCL, Age UK, to provide likes and retweets.

We will also reach out to age and elderly care related charities, professional organisations and councils directly via email to introduce this project, what it aims to achieve, and ask if they

would be willing to share the opportunity with their members through emails and/or newsletters etc.

The recruitment for the workshop will be based on individuals that have expressed their interest in an embedded survey question as well as responded directly to advertisement of the opportunity. These individuals will be contacted directly through email to ascertain availability and continued interest before invitations are sent out to those selected.

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