Department of Health & Social Care

Research and development work relating to assistive technology

2020–21

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Introduction

About this report

Section 22 of the Chronically Sick and Disabled Persons Act 1970 requires a report to be placed before Parliament each year on progress made in Government-funded research relating to equipment that might increase the range of activities and independence or well-being of disabled people, known as assistive technology.

Working with stakeholders, in 2001 the Foundation for Assistive Technology developed the following definition for assistive technology:

> *Assistive technology is any product or service designed to enable independence for disabled and older people.*

This broad definition means that a wide range of products and services are eligible for inclusion in this report. As technology advances, the breadth of work covered is constantly expanding. The research covers not only specific products, but also systems, combinations of technologies, and interfaces to mainstream technology such as the internet. Furthermore, research focused on the wider neighbourhood are also eligible for inclusion in this report, which might include clinical and public health researchers working with engineering, housing, architects and urban planning experts to make improvements for disabled or older people. In addition to addressing issues associated with physical health, developments in various types of assistive technology can also help people with mental health difficulties live more independent lives; these can often involve online and behavioural approaches rather than devices. Developments with a focus on mental health are also eligible for inclusion in this report.

For the purpose of this report, products and systems are further classified as assistive technology if their adoption and use is under some measure of control by the disabled or older end user and there is a level of meaningful interaction by the end user with the product or system. This therefore excludes telemedicine services such as videoconferencing between a general practitioner and a hospital consultant, which uses equipment in the hospital and GP surgery, as these technologies are primarily used by and operated under the control of healthcare professionals. Neither does the report feature research on implanted technologies over which the user has no control or interaction, such as hip replacements.

This report aims to reflect research relating to a wide range of impairments and conditions, and to cover research on service provision and patterns of use as well as development and evaluation of technologies. It highlights developments in priority setting and funding for assistive technology research and innovation and some particular areas of research activity. The Annex provides a list of Government-funded assistive technology research and development projects current in 2020–21.

Glossary of organisation acronyms

AHRC	Arts and Humanities Research Council
CSO	Chief Scientist Office of the Scottish Government Health and Social Care directorates
DfE	Department for Education
DfT	Department for Transport
EPSRC	Engineering and Physical Sciences Research Council
ESRC	Economic and Social Research Council
HCRW	Health and Care Research Wales
HEE	Health Education England
JLA	James Lind Alliance
MRC	Medical Research Council
MHCLG	Ministry of Housing, Communities and Local Government
NHSE	NHS England
NIHR	National Institute for Health Research
UKRI	UK Research and Innovation

Developments in priority setting and funding

This section highlights developments in priority setting and funding for assistive technology research and innovation. It provides a few examples of Government funding related to assistive technology and any current or planned funding rounds/calls, developments of research networks that will shape the direction of new assistive technology research, and any other planned work as a result of funding.

JLA Priority Setting Partnerships

The James Lind Alliance (JLA) is a non-profit-making initiative that brings together patients, carers and clinicians in Priority Setting Partnerships (PSPs) to identify and prioritise the top 10 unanswered questions or evidence uncertainties in a particular health condition or setting. The aim of the PSPs is to ensure that researchers and research funders are aware of the issues that matter most to patients and clinicians. The National Institute for Health Research (NIHR) funds the infrastructure of the JLA.

Over 100 PSPs have now been completed. During 2020–21, research priorities were agreed for a range of health conditions and settings, including complex fractures, advanced heart failure, COPD flare-ups, and blood pressure in pregnancy.

The stroke PSP, which started in 2019, published its agreed priorities in June 2021. A number of these priorities were topics where researchers may wish to include assistive technologies, for example communication difficulties in stroke survivors and support for the long-term impacts on the abilities necessary for everyday life.

Among the top research priorities agreed by the recently concluded occupational therapy PSP was the question ‘How does assistive technology, compensatory equipment and housing adaptations provided through occupational therapy impact on the lives of people who access services?’. The PSP also prioritised the following uncertainty: ‘How can occupational therapists work effectively with digital technology to enhance their interventions and lives of people who access services? (e.g. using smart devices to manage health and illness)’.

A new PSP in digital technology in adolescent inflammatory bowel disease was initiated in 2021. This exercise is likely to identify uncertainties related to assistive technologies when it concludes next year.

Current National Institute for Health Research calls

The NIHR has a number of current and recently closed calls. These include invitations for research concerning different aspects of mental health and improving support for adult and/or older carers, and proposals for developing programmes for ambulant children and adolescents with cerebral palsy. In addition, the NIHR is developing a broad focus on dementia research that involves any aspect of prevention, diagnosis, treatment, support or care, and related health and social care services. These calls may attract applications that evaluate assistive technology.

EPSRC and NIHR partner to transform care and health at home and enable independence

The Engineering and Physical Sciences Research Council (ESPRC) and NIHR are currently exploring the possibility of commissioning research that focuses on transforming care and health at home and/or enabling independence. The focus will be on projects that address issues at the intersection of housing, social care and healthcare provision. Potential areas in the scope include the role of assistive technologies in maintaining independence and health at home, and larger infrastructure interventions and tools that enable informed decision-making on housing and care.

UKRI ISCF: the Healthy Ageing Challenge

The UK Research and Innovation (UKRI) Industrial Strategy Challenge Fund (ISCF) addresses the big societal challenges faced by UK businesses today. It is made up of 23 challenges, covering four themes of the Government's industrial strategy: clean growth, ageing society, future mobility, and artificial intelligence and data economy.

The Healthy Ageing Challenge supports businesses, including social enterprises, to provide the products and services that will enable people to remain active, productive, independent and socially connected across generations for as long as possible. For example, the Blackwood Neighbourhoods for Independent Living project, based in Scotland, was funded through Innovate UK under this challenge. Some of the aims of this project relating to assistive technology are to design age-friendly homes, support social connections and create healthy active living places. The age-friendly homes will feature home automation and home health monitoring to enhance independent living; a digital hub will allow residents to play out their ageing journey through gamification and set neighbourhood goals and rewards to share with other communities. In addition, a tablet device app will be designed to support residents in the neighbourhood with a range of services and information linked to their health and wellbeing goals.

As part of this challenge, a competition to support social enterprises in developing products and services that tackle some of the impacts of ageing was launched in July 2021 via the Small Business Research Initiative (SBRI). This initiative will provide funding of up to £150,000 for individual successful projects as a share of an overall £4 million investment. Successful projects may choose to tackle one or more relevant topics that include common complaints of ageing (impaired hearing, eyesight, mobility, deteriorating mental and physical wellbeing), designing age-friendly homes and living well with cognitive impairment.

Department for Education: Education Technology for SEND

The Department for Education (DfE) published its Education Technology (EdTech) strategy in April 2019 on realising the potential of technology in education, which was supported by £10 million in funding. As a result, the DfE launched a series of EdTech challenges to encourage change in the use of technology across the education system in England. Challenge 6, 'identify the best technology that is proven to help level the playing field for learners with special educational needs and disabilities', focused on assistive technologies. The DfE is currently working with an assistive technology advisory group to help steer activity to support the challenge, and an 'Assistive Technology Testbed' programme was announced to develop the evidence base by hosting trials of technologies in 100 schools. To inform these and future activities, a rapid literature review on the use and impact of assistive technology on students with special educational needs and disabilities (SEND) was conducted from February to July 2020.

This review found strong evidence for the use of communication systems (augmentative and alternative communication – AAC – devices). These are known to improve the independence, educational outcomes and quality of life of students with special needs and disabilities. However, the review also highlighted that, despite their potential to provide students with the ability to access and engage with the curriculum on equal terms, assistive technologies currently remain underutilised in the educational sector. These issues became more apparent during the COVID-19 pandemic, when many children with SEND experienced considerable difficulties and barriers related to the accessibility and availability of online learning management systems and materials and appropriate assistive technology devices and services. The latter finding has been supported by two reports focusing explicitly on development throughout the COVID-19 pandemic: the parliamentary report Lessons from Lockdown: What we learned about Education Technology in 2020 and the EdTech Survey 2020–21 that the DfE commissioned to evaluate the current state and usage of technology across schools in England.

The National Disability Strategy: a new Centre for Assistive and Accessible Technology and other funding commitments

Published in July 2021, the National Disability Strategy sets out the actions the Government will take to improve the everyday lives of the over 14 million disabled people who live in the UK. The strategy was developed with the input of more than 14,000 disabled people, as well as disability organisations, businesses, policy experts and many others, and presents immediate commitments as well as longer-term plans of Governmental departments and agencies that aim to enable people with disabilities to live full, independent lives. These plans include a strong commitment to take full advantage of the potential of assistive technologies by investing up to £1 million in 2021–22 in the development of a new Centre for Assistive and Accessible Technology. Part 2 of the strategy details that the specific aims of the centre are yet to be established, but these may include acting as a central source of evidence and expertise as well as piloting and helping to scale new models of delivering technology in a more joined-up, cost-effective and user-friendly way. Other aims may include ensuring more effective awareness raising, training and support around assistive technology. The Disability Unit, responsible for the creation of the strategy, will lead this work. It will set the centre's objectives by establishing the current and future assistive and accessible technology needs of disabled people in England and will report on progress by summer 2022.

The National Disability Strategy also outlines a range of planned developments regarding research and innovation activities across several areas, such as public services, housing, shopping, jobs, education and transport. For example, the Department for Transport (DfT) plans to commission research into the design of bus stations and bus stops in England by April.

To improve disabled consumers' shopping experiences, there are plans to explore a new assistive technology challenge around shopping and to commission research to improve understanding of disabled people's experiences accessing products and services in the UK. Such research is likely to provide key developments and insights related to assistive technologies in infrastructure (e.g. buildings, pavement) and assistive technologies themselves, as well as access to them (e.g. home pages and devices enabling access to online shopping), which often act as key barriers to disabled consumers' choices.

Having conducted a consultation on raising accessibility standards for new homes in England in December 2020, the Ministry for Housing, Communities and Local Government (MHCLG) is now commissioning new research to develop the statutory guidance on meeting building regulations covering access to and use of buildings (in September 2021, the MHCLG was

renamed the Department for Levelling Up, Housing and Communities). This research is planned to provide evidence that will help to improve guidance and inform future policy. It will consider modern building design approaches, technology, and building use and operation with regard to accessible housing and, therefore, will be highly relevant to assistive technologies innovation.

Research current in 2020–21

This report details a wide breadth of research activity, supported by a variety of funders and host institutions. This section describes some of the studies that seek to explore the challenges and potential solutions affecting the independence of elderly and disabled people.

Ensuring safety and providing high-quality care throughout a pandemic

The COVID-19 pandemic has brought to the forefront the potential of assistive technologies to enable access to therapies and care from home, to provide virtual support for elderly and disabled people, as well as their carers, and to ensure the safety of clinically vulnerable people when they interact with others. Consequently, several projects focusing on assistive technologies have been funded since the start of the pandemic that directly or indirectly help to address the challenges that arise when airborne and highly infectious viruses necessitate the minimisation of physical contact.

Innovate UK has funded several projects that focus on the development of assistive technologies that provide physical safety measures for clinically vulnerable people whose conditions make it difficult to adhere to official guidance around hand sanitising, mask wearing and social distancing as expressed in the 'Hands, Face, Space' public information campaign. For example, wheelchair users are at increased risk of contracting COVID-19 because it can be difficult to keep wheelchairs free of airborne or surface-based droplets. In addition, as they are below the height of most standing individuals, wheelchair users are at increased risk of having such droplets land on them or their equipment. To address these issues, Centaur Robotics Ltd is developing personal electric vehicles (PEVs) that can better protect users from disease transmission because they are height adjustable, require less manual handling and are easier to clean. The wheelchair also helps to enforce social distancing through collision avoidance and visual/audible/haptic cues. Another component of this work is the evaluation of antiviral material that may further help to keep wheelchairs virus-free.

Another focus of this report is virtual platforms to help clinically vulnerable people and their carers to cope with social isolation, loneliness and the increased care burden resulting from shielding at home. For example, the NIHR is funding a team at Bangor University to evaluate the costs and benefits of iSUpport, an online learning and virtual support programme for carers of people living with dementia. As part of this project, researchers will also adapt the platform for young carers of people living with dementia with the aim of reducing their distress. As caregiver breakdown is a common reason for the unplanned admission of older people into permanent nursing or residential care, this platform could, in the long term, lead to a decrease in care home admissions and a reduction in health and social care costs.

The COVID-19 pandemic has also increased pressure on the NHS to allocate healthcare resources in the most efficient way while ensuring that urgent care needs are addressed. Developing assistive technologies that enable access to critical care and rehabilitation programmes from home are therefore highly important, and several projects focus on addressing this challenge. For instance, a project funded by Innovate UK is developing of the world's first post-surgery prosthesis consisting of a soft, flexible device that can be fitted at home or via telemedicine within 24 hours of an operation. It enables prosthesis use and rehabilitation to begin straight away, allowing for critical early access to prosthesis while at the same time removing waiting times that frequently amount to over 6 months. The patented 'soft-socket' design means

that the prosthesis can be fitted easily to a wide range of residual limbs in a similar way to a sock. The device also removes the intensive, expensive hands-on nature of the prosthesis-fitting service. This way of working is likely to be associated with a reduction in the risk of amputees contracting COVID-19 at an appointment, while at the same time freeing up critical care resources.

Systems can also assist with the remote delivery of care or therapy, enabling end users to live independently for longer. Several projects in this report focus on the benefits and role of home-monitoring systems in providing care. For instance, Perspective Ltd's eHomeCare system, funded by Innovate UK, addresses frailty by utilising novel indoor positioning and three-dimensional pose analysis techniques to provide continuous assessment and trend analysis of numerous outcomes, including stability, falls and fall location. This information allows frailty to be accurately and objectively graded without the need for an appointment. The information is also used to guide an integrated remote physiotherapy application that provides real-time feedback on performance and allows personalised adjustment to the subsequent exercise programmes. Finally, the data will inform improved self-care and timely interventions and therefore contribute to reducing and potentially reversing frailty, reducing the frequency of falls and enabling better care-planning.

Supporting participation in public settings and independence of children and adults with visual impairments

Visual impairments impact all areas of life, as visual cues help to orient us both physically and socially in new environments. Such cues may be especially important for children and young adults as part of acquiring social skills and becoming independent. A range of projects included in this report explore how assistive technologies can help people with visual impairments to orient themselves in their spatio-social surroundings. For example, an EPSRC-funded studentship at the University of Bristol explores how artificial intelligence can support the development of social skills of visually impaired children. Working with visual agent technology that is in development at Microsoft's Project Tokyo, researchers are exploring how such technology might be used to empower children to develop awareness and understanding of others' attentional patterns, as well as their embedding in spatio-social relationships.

Other examples include research focused on the benefits of glasses. Researchers at the University of Oxford, funded by the NIHR, are working on extending the use of smart glasses to a larger audience. These glasses have been shown to dramatically increase a person's ability to see and recognise faces and obstacles, but they were of benefit to only 10% of people with central vision loss. The research team are now focusing on developing novel software solutions for these glasses to enable more people with visual impairments to benefit from regained independence. As part of an extensive programme to better understand homonymous hemianopia (visual field loss that affects both eyes) in childhood, researchers at the Great Ormond Street Hospital are evaluating the use of prisms on glasses for children with this condition. This project is funded by HEE/NIHR, and one of its aims is to review whether horizontal prisms compared with sham glasses help children with homonymous hemianopia in improving visual function and quality of life.

Navigating urban indoor spaces such as shopping centres or transport hubs is especially challenging for people with severe visual impairments and may prevent them from fully accessing public spaces. Recent developments aimed at allowing people to safely navigate escalators include, for example, 'beacons' that send signals to Bluetooth-enabled devices such as smartphones. However, such solutions have not yet been able to perform well enough

to satisfactorily enable safe navigation. Research funded by Innovate UK aims to develop a novel interface that allows the detection of beacon signals directly with the 'smart' cane device developed by WeWalk Ltd. This device screws on to a user's existing cane, detects obstacles at knee to head height and provides audio-based navigation directly to a user's smartphone. By combining existing devices and infrastructure through a novel integrity-monitoring layer, the new Indoor Navigation System will provide high-accuracy and turn-by-turn indoor audio-based navigation for visually impaired people, thereby ensuring that they have full access to urban spaces.

Extending the utility of existing assistive technologies through novel software solutions

A range of projects in this report highlight how novel software solutions, such as platforms, systems and interfaces, can improve the utility of assistive technologies or enable a larger audience to use them. The Indoor Navigation system, discussed above, is an example of how such a software solution can expand the utility of medical devices and infrastructure systems by combining them. In this way, these solutions contribute to the efficient use of resources in the health and social care sector.

For people with reduced mobility, the ability to use a powered wheelchair can enable a larger degree of independence and is associated with improved wellbeing and quality of life. An EPSRC-funded award at the University of Portsmouth aims to enable greater utility of such wheelchairs among disabled people. The study focuses on digitalising existing analogous assistance systems and developing AI solutions for wheelchair use that will make driving easier and, consequently, more accessible. These efforts include digitalising and redesigning several systems for collision avoidance and effort-reduction systems, wheelchair tracking, and sensors that detect both the environment and the abilities of the driver. The redesigned systems will be connected via a new digital platform, and different AI techniques will be employed for different tasks within this platform. The result is a smart system that shares control between the wheelchair user and an intelligent sensor system, which will allow some people whose conditions (e.g. lack of spatial awareness) have prevented them from independent wheelchair use to use a wheelchair independently for the first time. Improving the autonomy of wheelchair users will also reduce the need for carers. Combined with the lower cost of digital over analogous systems, these new developments may also lead to cost savings for both the NHS and care institutions.

Approximately 11 million people in the UK live with some form of hearing impairment. A range of projects in this report focus on developing new software to address issues around hearing loss. The inability to distinguish speech in noisy environments and properly engage with audio communications in public environments may impact the ability of people with hearing impairments to participate in public life. For example, existing public 'hearing assistance' systems often require the user to borrow a receiver and headphones, which is impractical and unhygienic. Alternative systems comprise induction loops that transmit audio directly to hearing aids but are often both costly to install and limited to telcoil-equipped hearing aids. Research funded by Innovate UK aims to address this issue and both improve the adoption of hearing assistance and widen access to its benefits by developing new fundamental technologies, devices and infrastructure for a new audio distribution system for public hearing assistance. By developing a new platform for direct-to-hearing aid communication, this system will extend the usability of users' existing hearing aids.

Extending the utility of existing technologies by updating the software or replacing parts of devices instead of developing entirely new ones is not only a more sustainable solution but also

more convenient for users. Research funded by the MRC aims to improve the use of cochlear implants. Cochlear implants are devices that provide a sense of sound to people who are severely or profoundly deaf by electrically stimulating the auditory nerve in place of the damaged sensory hair cells. However, understanding speech in noisy environments is a major problem for cochlear implant users and can have a negative impact on their quality of life and mental health. By combining computational models simulating auditory nerve response with machine-learning algorithms trained to reduce interfering noise, the project contributes to a better understanding of the transmission of sound by cochlear implants. An optimised compensation strategy for the specific requirements of cochlear implant users will be developed and designed so that it can be integrated into the external speech processor of a cochlear implant without the need for surgical re-implantation of the implant itself. Thus, the project will help cochlear implant users to overcome the communication challenges they face in their daily lives and improve cochlear implant use.

Annex. Listing of assistive technology research and development projects 2020–21

Note: When compiling the data for the 2020–21 report, each funding organisation was provided with a definition of assistive technologies and a set of inclusion and exclusion criteria building on work previously undertaken by the Foundation for Assistive Technology (Appendix). Each funding organisation that contributed to the report was responsible for the identification and submission of projects to be included. The report was coordinated and produced by the NIHR.

Project title, contact and URL	Summary	Organisation, duration and funding
ApplTree: personalised digital reminding to support memory impairment after brain injury University of Glasgow	ApplTree prompts reminder setting, supports reminder entry to improve accuracy, and delivers users with prompts at the appropriate times. In this study, the features of ApplTree will be examined that suit participants with different needs based on cognitive ability. A pilot randomised controlled trial will be conducted to provide crucial information to inform a future larger-scale efficacy trial of ApplTree as an intervention to support memory in people with acquired brain injury.	CSO Jan 19 – Dec 20
Knowledge by Design Inc https://www.knowledge-by-design.com/ukat/index.html https://www.gov.uk/government/publications/assistive-technology-at-stakeholder-reports	A rapid review of the literature on assistive technology in education to understand the use of assistive technology by and impact of assistive technology use on students with special educational needs and disabilities (SEND).	DfE Feb 20 – Jul 20
The Development of Data Driven Design for Wheelchair Seats University of the West of England https://gtr.ukri.org/projects?ref=studentship-2179048	The Centre for Fine Print Research (CFPR) at the University of West of England's (UWE) offers a 3-year full-time Doctoral studentship that will undertake research into the data-driven design and fabrication of low-cost, patient-specific wheelchair seating for use in developing countries.	AHRC Jan 19 – Dec 21

Virtual reality simulation for robotic wheelchair assistive technologies University of Kent https://gtr.ukri.org/projects?ref=studentship-2466594	This research project focuses on a virtual reality simulation for robotic wheelchair assistive technologies to help wheelchair users practise navigating their chair in a safe manner prior to being exposed to real-life hazards by being trained in virtual reality (VR).	EPSRC Sep 20 – Sep 23
Neuro prosthetics upper limb amputees University of Southampton https://gtr.ukri.org/projects?ref=studentship-2473991	This study aims to explore arm and hand functions based on real time outputs from a range of sensors which will help underpin advanced prosthetic/orthotic device designs to enable patients to carry out basic activities.	EPSRC Oct 20 – Sep 24
Development of soft robotic prosthesis Heriot-Watt University https://gtr.ukri.org/projects?ref=studentship-2427842	This research focuses on soft robotics with flexible sensors to help prosthetics feel more like their biological counterpart with the final result of constructing a soft robotic prosthetic arm.	EPSRC Sep 20 – Aug 24
Sensory Foot Orthotics for balance and movement enhancement University of Salford https://gtr.ukri.org/projects?ref=studentship-2473788	This research explores the use of sensory foot orthotics to enhance balance and movement for vulnerable and frail people who are at risk of accidents.	EPSRC Oct 20 – Sep 24
Using artificial intelligence to develop joint attention in blind children University of Bristol https://gtr.ukri.org/projects?ref=studentship-2448501	This research focuses on the use of artificial intelligence to support the development of social skills of visually impaired or blind children by creating visual agent technology that helps them to develop awareness and understanding of spatial-social relationships.	EPSRC Oct 20 – Sep 24
Mobile Health Technology for Patients Suffering with Anxiety and Chronic Musculoskeletal Pain Queen Mary University of London https://gtr.ukri.org/projects?ref=studentship-2441569#/tabOverview	The aim of this studentship is to develop a mobile health application that enables patients with chronic musculoskeletal pain to reduce their pain and improve their quality of life through managing their anxiety.	EPSRC Jan 20 – Dec 22

Sensorimotor Learning for Control of Prosthetic Limbs Newcastle University https://gtr.ukri.org/projects?ref=EP%2FR004242%2F1 Transferred to University of Edinburgh https://gtr.ukri.org/projects?ref=EP%2FR004242%2F2	Insight gained through in-vivo experiments, exploratory studies involving able-bodied volunteers and pre-clinical work with people with limb loss will inform the design of novel algorithms to enable seamless control of prosthetic hands. The research will culminate with a unifying theory for learning to control prosthetic hands that will be tested in an NHS-approved, pre-clinical trial.	EPSRC Feb 18 – Aug 20 £1,028,682 Sep 20 – Jan 23 £712,797
Physiologically inspired simulation of sensorineural hearing loss Cardiff University https://gtr.ukri.org/projects?ref=EP%2FR010722%2F1	This project will construct sounds that simulate the auditory experience associated with different types of hearing impairment and demonstrate that it can reproduce the patterns of problems experienced by hearing-impaired listeners.	EPSRC Mar 18 – Mar 21 £298,015
Shape sensing textile for orthotics – SmartSensOtics University of Sussex https://gtr.ukri.org/projects?ref=EP%2FR013837%2F1	This research team aims to develop a smart, portable and stretchable textile sleeve with integrated sensors connected to a smartphone to realise an entirely new, versatile and wearable body-shape imaging technique. The digital limb models can then be used for the computer-aided fabrication of customised orthotics, without the need for significant infrastructure.	EPSRC Feb 18 – Jan 21 £744,204
Fit-for-purpose, affordable body-powered prostheses University of Salford https://gtr.ukri.org/projects?ref=EP%2FR013985%2F1	This project will bring together an experienced team from across the UK, Uganda and Jordan to create a new body-powered prosthesis that is optimised for adoption by prosthetic services in lower- and middle-income countries and acceptable to users in these countries. This will include establishing methods of fabrication, fitting and evaluation of the prosthesis that are appropriate to lower- and middle-income countries.	EPSRC Feb 18 – Jan 22 £1,412,730

A step change in LMIC prosthetics provision through computer aided design, actimetry and database technologies University of Southampton https://gtr.ukri.org/projects?ref=EP%2FR014213%2F1	Alongside a team of expert clinicians, academics and policy makers in Cambodia, this research team aims to conduct two data-technology research studies to develop tools to improve prosthetic and orthotic service access, train clinicians and improve efficiency of service funding use.	EPSRC Feb 18 – Jan 21 £909,511
Low cost through knee prostheses. TaKeuP Imperial College London https://gtr.ukri.org/projects?ref=EP%2FR014248%2F1	This research team seeks to develop a low-cost through-knee prosthesis, the initial concept for which has been developed by the applicants through prior work with partners in Cambodia. This will be developed further to create a pathway to support the translation of future technology projects and the development of a route to harness the technology development for those in lower- and middle-income countries for the benefit of healthcare in the UK.	EPSRC Feb 18 – Jan 21 £888,571
Cross-model interactive tools for inclusive learning University of Bristol https://gtr.ukri.org/projects?ref=EP%2FN00616X%2F2	The aim of this fellowship is to research and develop interactive learning tools to make mixed classrooms more inclusive of visually impaired students.	EPSRC Mar 16 – Feb 21 £706,108
Empowering next generation implantable neural interfaces Imperial College London https://gtr.ukri.org/projects?ref=EP%2FM020975%2F1	This fellowship is focused on next-generation neural interfaces that can be used with assistive technologies such as prostheses or mobility aids.	EPSRC Aug 15 – Oct 20 £1,016,559
Hub for device personalisation in the treatment of congenital diseases University College London https://gtr.ukri.org/projects?ref=EP%2FN02124X%2F1	This project will drive the development of bespoke devices and tailored therapies for children and young adults born with physical defects. Engineering methods and computer virtual reality will be used to study the shape of the patient defects and design new devices that can be easily tailored to individual needs.	EPSRC Apr 16 – Mar 22 £1,002,828

Inclusive Digital Content for People with Aphasia (INCA) City, University of London https://gtr.ukri.org/projects?ref=EP%2FP025587%2F1	The aim of this project is to investigate, co-design and trial digital content tools for people with aphasia. The research will explore a blended approach to digital content, intertwining the digital and physical worlds, and will have an emphasis on co-creation with users.	EPSRC Jul 17 – Jun 20 £496,293
Osteoarthritis Technology NetworkPlus (OATech+): a multidisciplinary approach to the prevention and treatment of osteoarthritis Cardiff University https://gtr.ukri.org/projects?ref=EP%2FN027264%2F1	A network of academics, clinicians and industry representatives is looking to provide high-level evidence of the efficacy and safety of medical devices relating to musculoskeletal disorders and osteoarthritis through clinical studies and with a high degree of user involvement. The studies will involve biology, engineering and biomechanics. The aim is to identify the challenges to technology development, which will help to ensure that future studies are conducted with the latest scientific advances incorporated.	EPSRC Oct 16 – Jun 22 £968,485
A robot training buddy for adults with autism spectrum disorder (ASD) https://www.socoro.net/ University of Glasgow https://gtr.ukri.org/projects?ref=EP%2FN035305%2F1 Heriot-Watt University https://gtr.ukri.org/projects?ref=EP%2FN034546%2F1	Funded by the EPSRC, the Socially Competent Robots (SoCoRo) project aims to develop a socially competent robot training buddy that will help adults with ASD to better deal with social signals in work-related scenarios.	EPSRC Jan 17 – Sep 21 £355,563 Nov 16 – Jun 21 £711, 763
EPSRC Centre for Doctoral Training in Prosthetics & Orthotics University of Salford https://gtr.ukri.org/projects?ref=EP%2FS02249X%2F1	The EPSRC Centre for Doctoral Training in Prosthetics and Orthotics has been established. This will address the national, and global, shortage of suitably skilled engineers and scientists to become future innovators in P&O technologies. The Centre will support a minimum of 58 doctoral students, whose studies will enable them to become leaders of the future.	EPSRC Apr 19 – Sep 27 £5,526,315

REST: Reconfigurable lower limb Exoskeleton for effective Stroke Treatment in residential settings University of Leeds https://gtr.ukri.org/projects?ref=EP%2FS019219%2F1 King's College London https://gtr.ukri.org/projects?ref=EP%2FS019790%2F1	The long-term goal of this project is to develop a nationwide robot-assisted home-based rehabilitation programme for stroke patients that builds on the technology and the experimental evidence originating from this proposal.	EPSRC Apr 19 – Mar 22 £1,065,414 Apr 19 – Mar 23 £412,534
FREEHAB: accessible, comfortable and adaptable wearable rehabilitation and assist devices University of Bristol https://gtr.ukri.org/projects?ref=EP%2FS026096%2F1	The FREEHAB Healthcare Impact Partnership will develop soft wearable rehabilitative devices to assist in the rehabilitation around age-related musculoskeletal and neurological conditions.	EPSRC Nov 19 – Oct 22 £1,181,154
Personalised approach to restoration of arm function in people with high-level tetraplegia Keele University https://gtr.ukri.org/projects?ref=EP%2FR035091%2F1 Transferred to University of Aberdeen https://gtr.ukri.org/projects?ref=EP/R035091/2	This project aims to develop efficient methods for personalising assistive technology to restore arm function in people with high-level spinal cord injury. Using a combination of electrical stimulation and mobile arm supports, the project will use computational models specific to the individual's functional limitations to produce patient-specific interventions.	EPSRC Nov 18 – Oct 19 £386,807 Oct 19 – Feb 22 £268,665
Using artificial intelligence to share control of a powered-wheelchair between a wheelchair user and an intelligent sensor system University of Portsmouth https://gtr.ukri.org/projects?ref=EP%2FS005927%2F1	Research will focus on the novel use of sensors and inventing new shared control systems and artificial intelligence (AI) to have a significant and positive impact on the lives of both current and potential powered-wheelchair users.	EPSRC Dec 18 – Apr 22 £465,562

Towards a multisensory hearing aid: engineering synthetic audiovisual and audiotactile signals to aid hearing in noisy backgrounds Imperial College London https://gtr.ukri.org/projects?ref=EP%2FR032602%2F1	The aim of this fellowship is to develop a radically different technology for assisting people with hearing impairments to understand speech in noisy environments, namely through simplified visual and tactile signals that are engineered from a speech signal and that can be presented congruently to the sound.	EPSRC Jan 19 – Feb 21 £1,029,424
Environment and Listener Optimised Speech Processing for Hearing Enhancement in Real Situations (ELO-SPHERES) University College London https://gtr.ukri.org/projects?ref=EP%2FS03580X%2F1 Imperial College London https://gtr.ukri.org/projects?ref=EP%2FS035842%2F1	The aim of the research is to have a better understanding of the problems that hearing-impaired listeners experience in noisy, multiple-talker conversations, particularly with regard to (1) their abilities to attend to and recognise speech coming from different directions while listening through binaural aids, and (2) their use of audio-visual cues. Virtual reality simulations of complex listening environments and audio-visual tests will be developed to assess listeners' abilities and will investigate how the abilities of hearing-impaired listeners vary with their degree of impairment and the complexity of the environment.	EPSRC Oct 19 – Sep 22 £554,976 £587,008
Challenges to revolutionise hearing device processing Cardiff University https://gtr.ukri.org/projects?ref=EP%2FS031324%2F1 University of Sheffield https://gtr.ukri.org/projects?ref=EP%2FS031448%2F1 University of Nottingham https://gtr.ukri.org/projects?ref=EP%2FS031308%2F1 University of Salford https://gtr.ukri.org/projects?ref=EP%2FS031324%2F1	These four individual studies will run a series of signal processing competitions (challenges) that will deal with increasingly difficult scenarios of hearing speech in noise. The data and tools will form a test-bed to allow other researchers to develop their own algorithms for hearing aid processing in different listening scenarios, which will improve algorithms for hearing aid processing.	EPSRC Nov 19 – Sep 24 £287,990 Jan 20 – Dec 24 £371,114 Nov 19 – Oct 24 £251,509 Nov 19 – Oct 24 £287,990

A sensorimotor PROsthesis for the upper LIMB (PROLIMB) University College London https://gtr.ukri.org/projects?ref=EP%2FV01062X%2F1 University Hospitals Coventry and Warwickshire NHS Trust https://gtr.ukri.org/projects?ref=EP%2FV010808%2F1	In this project, the research teams aim to model, design, fabricate and validate an affordable body-powered prosthetic fingertip digit with integrated mechanical haptic feedback.	EPSRC Jan – Dec 23 £425,311 Apr 21 – Mar 24 £164,728
Automatic posture and balance support for supernumerary robotic limbs Queen Mary University of London https://gtr.ukri.org/projects?ref=EP%2FT027746%2F1	The research team will study how the ergonomics of supernumerary limbs for material handling can be improved through additional back and balance support. The implementation will be based on creating and using innovative mechatronic technologies and posture assessment and data processing methods.	EPSRC Jan 21 – Dec 23 £373,312
COG-MHEAR: towards cognitively-inspired 5G-IoT enabled, multi-modal hearing aids Edinburgh Napier University https://gtr.ukri.org/projects?ref=EP%2FT021063%2F1	This research team aim to completely rethink the way hearing aids are designed. Their transformative approach will draw on the cognitive principles of normal hearing by creating multi-modal ‘audio-visual’ aids that not only amplify sounds but contextually use simultaneously collected information from a range of sensors to improve speech intelligibility. This project will also use wearable sensors to estimate listening effort and its impact on the person and use this to tell whether or not the speech enhancement process is actually helping.	EPSRC Mar 21 – Feb 25 £3,259,000

Sustainable Care: connecting people and systems University of Sheffield http://circle.group.shef.ac.uk/sustainable-care/ https://gtr.ukri.org/projects?ref=ES%2FP009255%2F1	This programme concentrates on the care needs of adults living at home with chronic health problems or disabilities and seeks sustainable solutions to the UK's contemporary 'crisis of care'. This includes assessing the potential of emerging technologies to enhance care system sustainability; developing case studies of emerging home care models; and exploring how care technologies can be integrated to support working carers, ensuring wellbeing outcomes across caring networks.	ESRC Nov 17 – Aug 21 £2,156,865
Sustainable Care Innovation Fellowship: Accelerating implementation and uptake of new technologies to support ageing in place University of Sheffield https://gtr.ukri.org/projects?ref=ES%2FS002049%2F1	This research project will involve collaboration with industry partners to help address challenges in the implementation and uptake of new technologies to support sustainable arrangements for ageing in places capable of delivering wellbeing outcomes for older people.	ESRC Jan 18 – Jan 21 £248,697
A longitudinal investigation of new 'Smart Speaker' personal assistants to improve independence and wellbeing in social care settings Cardiff University https://healthandcareresearchwales.org/longitudinal-investigation-new-smart-speaker-personal-assistants-improve-independence-and-wellbeing	Can new 'Smart Speaker' technologies, such as the Amazon Echo, improve wellbeing, independence and safety in social care? This fellowship will investigate this question for people with learning disabilities living in supported accommodation and older adults living in sheltered accommodation.	HCRW Feb 20 – Feb 24 £331,479

AI (artificial intelligence) based healthcare system for elderly people – iChair Innovative Technology and Science https://gtr.ukri.org/projects?ref=104312	This research aims to develop a telemedicine-smart wheelchair that allows patients and caregivers to access patient data in real time. Using patient data collected from sensors attached to the wheelchair, AI algorithms will analyse the data to diagnose any associated conditions. The iChair project aims to develop and demonstrate a cost-effective wheelchair connectivity and remote monitoring technology that significantly increases user independence (mobility) and freedom (quality of living) while providing caregivers peace of mind and convenience.	Innovate UK Nov 18 – Dec 20 £344,543
Quick fitting of prosthetic sockets for above knee amputees – (QuickFit) LussTech Ltd https://gtr.ukri.org/projects?ref=133657	This project aims to develop a new application of the revolutionary QTSS sensors in healthcare and use new biomechanical analytical models to create a new procedure for prosthetic socket design.	Innovate UK Oct 18 – Mar 21 £972,982
Innovative Transfer Device Buckingham Healthcare Ltd https://gtr.ukri.org/projects?ref=104998	Buckingham Healthcare Ltd is seeking to develop an innovative transfer board for individuals with limited mobility. To do this, the company will harness recent advances in lightweight material, ergonomic design, and technologies to develop an innovative transfer board to reduce the risk of injuries to patients and carers.	Innovate UK Feb 19 – Oct 20 £193,711
Myndr peer-to-peer mental health support system Myndr Ltd https://gtr.ukri.org/projects?ref=42396	This research will focus on the further development of an AI-based mental health peer-to-peer support platform for company leaders and their employees. The anonymous support platform is designed to help those with common mental health problems to seek help and support from others who have experienced similar symptoms and conditions via an app with actionable steps and content.	Innovate UK Apr 20 – Sep 21 £303,155

Shower in a Can as an efficient alternative to traditional bed baths in health and social care Shower in a Can Limited https://gtr.ukri.org/projects?ref=62902	'Shower in a Can' is an innovative water- and detergent-based foam that is applied to the hands and body, does not require rinsing or towelling and has antibacterial properties. It was initially designed for use in the youth sport market and has grown in popularity in the camping, festival, outdoor sports and recreational markets as an effective alternative to handwashing and showering. This study will undertake testing to ensure that Shower in a Can's foaming soap formula is sufficiently antiviral, and that the antibacterial properties are also sufficient for the health and social care environment.	Innovate UK Jun 20 – Mar 21 £74,898
iHearBetter – a revolutionizing assistive listening device for hearing-impaired individuals AudioTelligence Ltd https://gtr.ukri.org/projects?ref=46691	This project will focus on the development of a new device to improve the way in which people with hearing impairment hear when there is background noise. AudioTelligence Ltd has already developed technology that can separate several different sound sources in noisy environments. Development now includes an easy-to-use device that can take these different sound sources and, based on cues such as eye movements or head turns, work out which of them a person wants to listen to.	Innovate UK Jun 20 – Feb 22 £394,163

Remote monitoring of elderly, vulnerable, and enhancing their mobility, through adaptive intelligent clothing (single platform wearable) for care homes, assisted living and personal health Decorte Future Industries Ltd https://gtr.ukri.org/projects?ref=62003 Remote monitoring of elderly, vulnerable, and enhancing their mobility, through adaptive intelligent clothing (single platform wearable) for care homes, assisted living and personal health: R&D, expanded testing and product-market engagement Decorte Future Industries Ltd https://gtr.ukri.org/projects?ref=81631	In these projects researchers seek to develop a low-cost, washable, intelligent shirt to be worn by care home residents that gathers, sends and remotely analyses biometric data. It includes an early warning system and distress detection. At the same time, the embedded hardware enhances the wearer's mobility and quality of life by allowing them to control surrounding devices with voice, gesture and touch through their clothing. Designed originally in the context of Defence, in response to COVID-19 the company aims to rapidly produce a basic version of its wearable platform for the care sector to help combat the effect of the virus.	Innovate UK Jun 20 – Nov 20 £50,000 Oct 20 – Jun 21 £169,740
CoCore – Covid Community Resilience and Engagement GDS Digital Services Ltd https://gtr.ukri.org/projects?ref=62905	This project aims to address societal challenges and potential life-enhancing opportunities, magnified by the impact of the COVID-19 crisis. The team intends to provide assistive technology and applications to enable individuals with disabilities to connect and communicate with professionals, family and friends, with minimal personal face-to-face visits, broaden their interests and social connections easily and safely, and deliver basic and essential services remotely and securely.	Innovate UK Jun 20 – Mar 21 £73,689

E-textiles based wearable electrode garment for rehabilitation and active living Etexsense Ltd https://gtr.ukri.org/projects?ref=59149	This project will develop a wearable electrode garment (sleeve/cuff) that can replace the traditional disposable hydrogel electrodes used in electrotherapy devices. The garment design will enable users to use it on different parts of the body (arms/legs/joints), be easy to use and last for over 1 year. It will allow people to undertake regular exercise independently, leading to improved physical function, increasing wellbeing and reducing strain on families, communities and the society.	Innovate UK Jun 20 – Mar 21 £73,929
Developing, implementing, and verifying the integrity of an indoor navigation system for visually impaired people Dynamic Metrics Ltd https://gtr.ukri.org/projects?ref=49740	This project will address the technical/ safety challenges that have prevented the widespread uptake of beacons for indoor navigation by developing a novel integrity-monitoring layer (providing safety-critical functionality) and usability framework that detects the beacon signals directly with the WeWalk smart cane to provide high-accuracy, turn-by-turn indoor audio-based navigation.	Innovate UK Oct 20 – Mar 22 £386,103
eHomeCare: Sustainable Tele-Home monitoring for healthy independent living of vulnerable groups Perseptive Ltd https://gtr.ukri.org/projects?ref=76855	Frailty is a key condition leading to loss of independence among people aged over 65 years that is typically diagnosed by clinicians via gait speed and a timed get up-and-go test. eHomeCare aims to provide a smart telecare solution using novel indoor positioning analysis to grade frailty remotely and monitor its development over time. Evidence shows that exercise can reduce or reverse frailty, and the information is also used to guide an integrated remote physiotherapy application via real-time feedback and personalised adjustment. By doing so, the system allows improved self-care, remote care and better care-planning through timely interventions.	Innovate UK Oct 20 – Sep 21 £157,058

Inclusive design of personal electric vehicles to protect against COVID-19 Centaur Robotics Ltd https://gtr.ukri.org/projects?ref=79085 Infection control to protect vulnerable wheelchair users Centaur Robotics Ltd https://gtr.ukri.org/projects?ref=84058	COVID-19 disproportionately affects wheelchair users. Centaur's personal electric vehicle (PEV) facilitates dignified, independent living but, more importantly, can better protect users from disease transmission by being height adjustable, requiring less manual handling, being easier to clean and helping to enforce social distancing through collision avoidance and visual/audible/haptic cues. This project focuses on keeping wheelchairs free of airborne or surface-based droplets to meet the new needs of highly vulnerable customers at risk of disease transmission. Centaur will test and deliver COVID-19 infection control product and service specifications and update its existing prototype antiviral materials.	Innovate UK Oct 20 – Jun 21 £174,982 Nov 20 – Apr 21 £92,092
Development of an immediate, post-surgery, upper-limb prosthesis: Wound soft, self-fittable and enabling critical rehabilitation and physiotherapy to start earlier for better healthcare outcomes Koalaa Ltd https://gtr.ukri.org/projects?ref=80454	Amputees typically wait over 6 months for first access to prosthesis use and rehabilitation. Koalaa aims to develop the world's first post-surgery prosthesis in the form of a soft, flexible device that can be fitted at home or via telemedicine within 24 hours of an operation.	Innovate UK Oct 20 – Jun 21 £141,428
Accessible navigation and associated opportunities Ghobi Ltd https://gtr.ukri.org/projects?ref=85145	This research focuses on the development of a data processing platform to facilitate navigation in the built environment (e.g. buildings parks green spaces neighbourhoods), especially by wheelchair users.	Innovate UK Nov 20 – Jul 21 £99,995

AI-based Assistive & Passive Technology for non-Invasive Elderly care (ADAPTIVE) miiCare Ltd https://gtr.ukri.org/projects?ref=68239	People living with dementia who suffer from frailty currently only have the option of wearable devices that indicate falls only after they have happened. miiCARE Ltd aims to develop a non-wearable assisted-living healthcare solution that utilises AI-based machine learning to learn about the acoustic characteristics of people's footsteps to predict the likelihood of falls, changes in postures or the progression of cognitive issues. This will enable preventative measures to be taken early and prevent escalation, allowing people living with dementia to remain in the comfortable, safe environment of their own homes.	Innovate UK Nov 20 – Apr 22 £394,543
The sixth digit The Active Hands Company https://gtr.ukri.org/projects?ref=72677	The team at Active Hands propose developing a multi-function stylus tool with the aim of enabling the user to press keys or interact with touchscreens when non-working fingers would otherwise make this job frustrating or impossible. This will support the user to live more independently, with an improved ability to access benefit information, book online shopping, operate technology, apply for jobs and continue to be part of society.	Innovate UK Nov 20 – May 21 £16,729
Path Feel –a smart AI insole for personalisation of care in chronic conditions and the elderly Walk with Path Ltd https://gtr.ukri.org/projects?ref=89788	This project will develop and commercialise a smart insole, Path Feel. The insole responds to pressure applied and provides vibrational feedback to the user to help them 'feel the floor' and achieve balance in real time. Embedded sensors gather data on walking that are used for diagnostics, personalised medicine and remote patient monitoring. This device aims to decrease instability and falls caused by reduced sensation in the feet that people with chronic conditions and the elderly often have.	Innovate UK Mar 21 – Mar 22 £50,000

AI-controlled adaptive fitting device for prosthetics and wearable technologies Unhindr Ltd https://gtr.ukri.org/projects?ref=10004425	Inflexible prosthetic sockets do not change shape as the wearer's stumps changes shape over the day, which can lead to wounds, ulcers and, ultimately, decreased mobility. To address this issue, a research team at Unhindr Ltd and their collaborators are currently doing further research and clinically developing Roliner, a sleeve-like device that is worn on the stump. Using AI to understand the hourly/daily changes in the stump, Roliner adapts and learns comfort preferences via an app to continuously adjust the fitting by inflating/deflating Roliner's micro-channels. Roliner will help amputees walk for longer, reducing muscle loss and the number of clinic appointments required for fitting adjustments and treating socket-induced wounds. This can save time and money for the patient and the healthcare provider.	Innovate UK Apr 21 – Sep 22 £392,625
Blackwood Neighbourhoods for Independent Living Blackwood Homes and Care https://gtr.ukri.org/projects?ref=10004488	Blackwood and partners aim to co-design neighbourhoods that support healthy ageing by having residents' choices at their heart. Blackwood's role is to facilitate engagement and co-design, learn about healthy ageing in an agile way, and position and adapt products and services in response. The multi-disciplinary project includes the design of accessible houses that feature home automation and health monitoring, as well as a tablet device app that supports residents through information and services. It also provides a digital community and learning environment that allows for health self-management through goal-setting, progress-tracking and interacting with others in a gamified environment.	Innovate UK Apr 21 – Mar 24 £5,912,251
The Glider Buckingham Healthcare Ltd https://gtr.ukri.org/projects?ref=98400	The research team will accelerate product development of a transfer assistance aid to improve users' access to toileting facilities, the Glider, improving independence, mobility and dignity for elderly, disabled and bariatric users.	Innovate UK May 21 – Oct 22 £279,315

Wireless Assistive Listening Solution – Bluetooth LE Audio Ampetronic Ltd https://gtr.ukri.org/projects?ref=102445	This project will develop the fundamental technologies, devices and infrastructure for a new audio distribution system for public hearing assistance. It will use new technologies for direct-to-hearing-aid communication, also allowing simultaneous participation on future smart devices. The new hearing-assistance platform will focus on dramatically improving the adoption of hearing assistance and widen access to its benefits.	Innovate UK May 21 – Nov 21 £209,755
Supported fall prevention exergaming, helping over-65s improve standing strength and balance and the NHS reduce costs Exyo Design Ltd https://gtr.ukri.org/projects?ref=10004470	The research team intend to address the issue of a lack of effective therapy solutions for fall prevention. They are developing a standing/balance rehabilitation aid that facilitates remote supervision and gamified therapy.	Innovate UK May 21 – Oct 22 £248,756
Sensory system abnormalities in childhood dystonia/dystonic cerebral palsy – are sensory networks modulated by deep brain stimulation? King's College London https://gtr.ukri.org/projects?ref=MR%2FP006868%2F1	This study's aim is to compare changes in sensorimotor cortex EEG activity in relation to a sensory or sensorimotor task in children with different types of dystonia and to investigate whether or not such changes relate to deep brain stimulation outcome.	MRC Nov 16 – Feb 22 £417,823
Brain machine interfaces based on subcortical LFP signals for neuroprosthetic control and neurofeedback therapy University of Oxford https://gtr.ukri.org/projects?ref=MR%2FP012272%2F1	This work will establish the foundations for novel brain-machine interfaces based on signals recorded from deep brain regions that contain rich information related to movement intention. The new framework will be used to control a prosthetic hand with graded gripping force, to provide neurofeedback training to reduce symptoms in Parkinson's disease, and to study the role of basal ganglia in the control and learning of movements.	MRC Sep 17 – Jan 22 £506,448

Auditory scene analysis (ASA) in acoustic and electric hearing University of Cambridge https://gtr.ukri.org/projects?ref=MC_UU_00005%2F3	This research team will use a combination of behavioural and electrophysiological techniques to (1) study the neural basis of ASA in normal-hearing listeners, (2) investigate its modulation by cognitive processes such as attention and language processing, (3) investigate why it is impaired in cochlear implant (CI) patients and (4) develop methods of improving auditory scene analysis and other aspects of hearing by CI users.	MRC Jul 17 – Mar 22 £321,000
Adaptive processing of spoken language University of Cambridge https://gtr.ukri.org/projects?ref=MC_UU_00005%2F5	The aim of this project is to use behavioural experiments, functional brain imaging and brain stimulation to understand the neural mechanisms that are critical for understanding spoken language and allow healthy adult listeners to adjust to and learn from encounters with different forms of language. A better understanding of these mechanisms will help us understand spoken language disorders following sensory impairment, brain injury or developmental disorders and contribute to successful learning and rehabilitation in educational and clinical settings.	MRC Jul 17 – Mar 22 £305,000
Multi-modal cue integration for auditory spatial location by normal-hearing and hearing-impaired listeners University of Nottingham https://gtr.ukri.org/projects?ref=MR%2FS002898%2F1	This research will use cutting-edge auditory experiments to answer two key questions. First, how does the auditory system join the multiple cues to location in complex, dynamic, multi-sound, audio-visual listening situations? Second, how does hearing impairment and aided listening affect this? Insights gained may help us to understand better how spatial hearing works in real, everyday listening, and will help inform how future hearing aids might be designed to improve spatial hearing	MRC Apr 18 – Sep 22 £1,456,854

Understanding and alleviating hearing disability: the contribution of natural behaviours University of Nottingham https://gtr.ukri.org/projects?ref=MR%2FS003576%2F1	For hearing aids to be more helpful, they must adapt to the moment-to-moment changes in situation that are part of people's everyday life, and the clinical prescribing of hearing aids needs to take more account of each patient's individual lifestyle and activity patterns. This project aims to provide insights that can form the basis of future improved hearing aid technology and prescribing by (1) conducting experimental studies measuring how people move and change communication tactics when their hearing is challenged, which will result in a mathematical model, (2) determining whether real-world hearing disability is driven by isolated events or by a 'grand average' of events over time, (3) devising and testing hearing-aid fitting protocols that account for patients' insensitivity to acoustic changes, (4) developing prototype hearing-aid technologies wthathich exploit or support listeners' natural behaviour and (5) exploring whether or not routine clinical data can support more individualised prescription of interventions for hearing loss.	MRC Apr 18 – Sep 22 £2,883,896
A patient-centred device to improve hearing aid satisfaction University of Manchester https://gtr.ukri.org/projects?ref=studentship-1916490	This studentship is focused on hearing aid satisfaction. The overall aim of the project is to develop software that accurately predicts perceived audio quality as well as the reason/ processing stage that caused the loss. It will do so by examining a broadcasted audio chain in a controlled listening environment in depth, from signal capture on the microphone through its processing to the listening experiences.	MRC Jan 18 – Jun 22
Robotics to enhance independence & safety for dementia patients in the home Imperial College London https://gtr.ukri.org/projects?ref=UKDRI-7003	This project aims to exploit the potential of AI to improve dementia care through the development of a family of robotic devices that can engage people living with dementia, helping improve safety in the home and enhancing quality of life. Once triggered, these robots will engage with the individual and act to reduce risks by directing them to address the hazard. Robots will also support the deployment of automated support tools.	MRC Apr 19 – Apr 25 £34,946

Restoring the sense of sound: deep-learning based compensation strategies for the electro-neural transmission of sound by cochlear implants University of Cambridge https://gtr.ukri.org/projects?ref=MR%2FT03095X%2F1	Compromised speech perception in noisy environments is a major problem for cochlear implant (CI) users and can have a negative impact on their quality of life and mental health. By combining computational models simulating auditory nerve response with machine-learning algorithms trained to reduce interfering noise, this project will contribute to a better understanding of the transmission of sound by CIs and help to overcome the communication challenges that users face in their daily lives, with the ultimate gain of improving CI use.	MRC Jun 20 – Jun 25 £1,037,336
Cortical determinants of human auditory cognition Newcastle University https://gtr.ukri.org/projects?ref=MR%2FT032553%2F1	The project aims to develop new hearing tests that provide improved predictions of how well people can understand speech-in-noise in the real world by testing their ability to group together and retain sounds that have a complex structure and separate these from a noisy background. The project will measure brain activity that allows people to separate mixtures of sounds such as speech in noise. This will provide other measures (in addition to the new listening tests) of the success of interventions, such as hearing aids, cochlear implants and hearing training.	MRC Dec 20 – Dec 25 £2,212,332
Individually randomised controlled multi-centre trial to determine the clinical and cost effectiveness of a home-based exercise intervention for older people with frailty as extended rehabilitation following acute illness or injury, including embedded process evaluation Bradford Teaching Hospital https://fundingawards.nihr.ac.uk/award/15/43/07	Frail older people who are admitted to hospital for acute illness are often frailer when they are discharged, which can mean that they are no longer able to perform daily tasks at home or live independently. The HOPE programme offers older people with frailty a 12-week physiotherapist-delivered exercise programme at home, involving five home visits and seven telephone sessions, as well as a complementary manual.	NIHR Mar 17 – Jun 23 £2,387,728

Investigating the effectiveness and cost effectiveness of using FITNET to treat paediatric CFS/ME in the UK University of Bristol https://fundingawards.nihr.ac.uk/award/14/192/109 www.bristol.ac.uk/ccah/research/childdevelopmentdisability/chronic-fatigue/fitnet-nhs/	FITNET is an internet-based treatment for children with chronic fatigue syndrome or ME. It provides cognitive–behavioural therapy through interactive sessions that children receive at home. Children are also required to complete homework relating to the sessions. Children and their parents are supported by cognitive–behavioural therapists	NIHR May 16 – May 22 £1,026,403
An Assistive Powered Wheelchair: Stage 2 Trial - Powered Wheelchair User Evaluation of an Obstacle Alerting System. A non-interventional study Clinical Research Network Kent, Surrey and Sussex Part of EDUCAT – www.educat2seas.eu	Powered wheelchair users can find driving safely and confidently a challenge, particularly in crowded spaces, in narrow corridors or when reversing. This can result in the user being more hesitant to use their wheelchair and may limit their mobility and independence. The goal of this study is to assist the powered-wheelchair user, by monitoring joystick movement and providing sensors and display screens, to drive more safely and confidently, thereby enhancing their independence and quality of life.	European Commission Mar 21 – Aug 21
Investigating SOcial Competence and Isolation in children with Autism taking part in LEGO-based therapy clubs In School Environments (I-SOCIALISE) Leeds and York Partnership NHS Foundation Trust https://fundingawards.nihr.ac.uk/award/15/49/32	The aim of the project is to use LEGO-based therapy to equip children with autism spectrum disorder with the necessary social skills for day-to-day life. This is done by using LEGO to make social interactions interesting to the children. The researchers want to find out if using LEGO therapy in schools would affect the social competence of children with autism spectrum disorder, as well as reducing their social isolation.	NIHR Jan 17 – Dec 20 £971,711

A non-inferiority randomised controlled trial comparing the clinical and cost-effectiveness of one session treatment (OST) with multi-session cognitive behavioural therapy (CBT) in children with specific phobias Leeds and York Partnership NHS Foundation Trust https://www.sheffield.ac.uk/scharr/sections/dts/ctru/aspect https://fundingawards.nihr.ac.uk/award/15/38/04	One-session therapy, an alternative to usual cognitivebehavioural therapy, is currently used successfully with adults but has not yet been tested for use with children. The researchers plan to compare one-session therapy with multi-session cognitive–behavioural therapy for the treatment of specific phobias in children, which can severely affect quality of life.	NIHR Jul 16 – Apr 21 £1,557,052
A pragmatic randomised controlled trial of sensory integration therapy versus usual care for sensory processing difficulties in autism spectrum disorder (ASD) in children: impact on behavioural difficulties, skills and socialisation (SenITA) Cardiff University https://www.cardiff.ac.uk/centre-for-trials-research/research/studies-and-trials/view/senita https://fundingawards.nihr.ac.uk/award/15/106/04	It is common for children with ASD to experience difficulty processing sensory information (sight, touch, sound, smell and taste). These problems can affect a child's ability to socialise and integrate into everyday life, as well as their behaviour. To address this, the researchers aim to find out whether or not delivered sensory integration using occupational therapists improves outcomes compared with usual care.	NIHR Jan 17 – May 21 £1,243,513

Improving the Wellbeing of people with Opioid Treated CHronic pain; I-WOTCH University of Warwick https://warwick.ac.uk/fac/med/research/ctu/trials/iwotch/ https://fundingawards.nihr.ac.uk/award/14/224/04	This research seeks to test the effect of the I-WOTCH intervention, a supportive self-management and information/advice about coming off opioid drugs (the I-WOTCH intervention), on how well people can get on with normal activities (e.g. work, family and social life), and opioid use, compared with usual care.	NIHR Sep 16 – Jul 21 £1,631,593
A wearable smart visual aid for central vision loss University of Oxford https://fundingawards.nihr.ac.uk/award/II-LB-0716-20005	This research aims to develop novel software solutions that make use of the latest head-mounted displays and validate these technologies with extensive testing of individuals with age-related macular degeneration (AMD). It builds on previous NIHR-funded research that involved the development and validation of a platform of smart glasses.	NIHR Jun 17 – Jul 20 £392,465
PROvision of braces for Patients with knee OsteoArthritis (PROP OA): a randomised controlled trial North Staffordshire Clinical Commissioning Group https://fundingawards.nihr.ac.uk/award/16/160/03	This project aims to show whether or not wearing a knee brace provides more relief for people with painful osteoarthritis of the knee than just usual primary care (education, advice and exercise), and whether or not this offers value for money for the NHS.	NIHR Sep 18 – Nov 22 £1,622,564
The Project About Loneliness and Social networks (PALS) study University of Southampton https://fundingawards.nihr.ac.uk/award/16/08/41	This research will evaluate the acceptability, effectiveness and cost-effectiveness of implementing the GENIE intervention to reduce loneliness and unwanted social isolation of adults in a community setting.	NIHR Mar 18 – Aug 22 £1,157,358

Immersive virtual reality to transform the lives of patients with psychosis Oxford Health NHS Foundation Trust https://fundingawards.nihr.ac.uk/award/II-C7-0117-20001 https://www.psych.ox.ac.uk/research/oxford-cognitive-approaches-to-psychosis-o-cap/projects-1/copy_of_overcoming-persecutory-delusions	Virtual reality therapy involves wearing a headset and interacting with computer-generated people. Uniquely,the virtual reality therapy in this study will use a virtual coach to guide the user through their thoughts, feelings and responses in social situations. People with psychosis and NHS staff will work together to develop the virtual reality therapy to ensure the best user experience. A further consultation process will produce a guide to using virtual reality in NHS psychosis services.	NIHR Jun 18 – Nov 21 £4,209,119
Enhancing the quality of psychological interventions delivered by telephone (EQUITy) Greater Manchester Mental Health NHS Foundation Trust https://fundingawards.nihr.ac.uk/award/RP-PG-1016-20010	This project will focus on improving the way in which psychological interventions are delivered over the telephone so that people can be sure to get the care they need. Improving Access to Psychological Therapies (IAPT) data will be explored to understand which groups of people have the greatest difficulties with telephone-delivered treatments. Patients and professionals will be consulted, and the knowledge gained from these approaches will be used to develop an intervention to help services improve the quality of telephone treatments.	NIHR Apr 18 – May 24 £2,524,745
Feasibility of a randomised controlled trial to examine the effectiveness of auditory-cognitive training to improve hearing aid users' speech perception outcomes, compared with hearing aids alone Nottingham University Hospitals NHS Trust https://fundingawards.nihr.ac.uk/award/PB-PG-0816-20044	This research builds on previous work that has shown that computer games designed to help people practise listening to speech can improve cognition and listening abilities in people with hearing loss and hearing-aid users. These games, termed auditory training, could help patients better understand speech in noise and thus improve communication, which can improve quality of life. This feasibility study will explore whether or not a large trial could work to understand the benefits of these games to patients.	NIHR Apr 18 – Oct 21 £249,414

Mobilising knowledge to improve assistive technology commissioning, service provision and sustained implementation University of Hertfordshire https://fundingawards.nihr.ac.uk/award/KMRF-2017-06-ST2-006	The aim of this project is to produce guidance that helps professionals in health and social care consider what they need to know to develop an assistive technology service that will improve experiences for people using it and improve the delivery of care.	NIHR May 18 – May 21 £201,441
Can smartphone and teleconferencing technology be used to deliver an effective home exercise intervention to prevent falls amongst community dwelling older people? A feasibility randomised controlled trial The University of Manchester https://fundingawards.nihr.ac.uk/award/PDF-2015-08-012	This study will explore whether or not the use of smartphone and teleconferencing technology can help to deliver effective one-to-one and group home exercise to prevent falls in older people.	NIHR Jan 16 – Oct 20 £300,929
Autism Spectrum Social Stories In Schools Trial 2 (ASSSIST2): A randomised controlled trial and economic evaluation of a Social Stories intervention to address the social and emotional health of children with ASD in primary schools Leeds and York Partnership NHS Foundation Trust https://fundingawards.nihr.ac.uk/award/16/111/91	This pragmatic cluster randomised controlled trial aims to examine the effectiveness and cost effectiveness of Social Stories for children with autism spectrum disorder and challenging behaviour. This design was drawn from the successful Health Technology Assessment feasibility study (ASSSIST).	NIHR Jun 18 – Jun 22 £1,081,529

A pilot randomised controlled trial of one to one befriending by volunteers, compared to usual care, in reducing symptoms of depression in people with intellectual disability University College London https://fundingawards.nihr.ac.uk/award/16/122/57	This team will carry out a pilot randomised controlled trial of one-to-one befriending by volunteers for people with intellectual disability, compared with usual care and a booklet of community resources.	NIHR Jul 18 – Jul 20 £357,768
Development and feasibility of a behavioural intervention to improve the beneficial use of hearing technology for adults with hearing loss University of Nottingham https://fundingawards.nihr.ac.uk/award/CDF-2018-11-ST2-016	This project will identify how individuals' behaviours are linked to their use of hearing technologies and will use this knowledge to develop an online tool to improve the use of hearing technologies.	NIHR Oct 18 – Jul 23 £593,402
The SAFEST Review: The Shock-Absorbing Flooring Effectiveness SysTematic Review including older adults and staff in care settings University of Portsmouth https://fundingawards.nihr.ac.uk/award/17/148/11	This project will aim to summarise what is known about shock-absorbing flooring in hospitals and care homes with regard to reducing injuries from falls. The review will highlight evidence that will support carers of older people. The findings will also be relevant to the design and infrastructure in hospitals and care homes.	NIHR Feb 19 – Aug 20 £126,914
Virtual reality supported therapy for the negative symptoms of psychosis King's College London https://fundingawards.nihr.ac.uk/award/17/59/13	This research aims to introduce a therapy designed to reduce negative symptoms and improve the recovery prospect of people with schizophrenia. The proposed therapy will be a virtual reality environment where participants will be able to experience and practise everyday life activities, such as talking to a total stranger and cooking a meal.	NIHR Mar 19 – Oct 21 £204,500

Improving Mental health therapy Provision, Research & Outcomes via Virtual Environments (IMPROVE) Emteq Limited https://fundingawards.nihr.ac.uk/award/NIHR201283	Delivering psychological therapy through virtual reality technology has the potential to help meet the needs of scalability and personalisation in treating mental ill-health. Emteq Limited is developing the IMPROVE platform (Mental health therapy Provision, Research & Outcomes via Virtual Environments). The platform will include (1) a prototype of a low-cost mobile sensor-enabled virtual reality headset to measure emotional responses in virtual reality, (2) a secure software platform for deploying virtual reality environments and associated back-end visualisation dashboard, and (3) software development kits to enable the use of a range of sensors (facial expression tracking, eye tracking and physiological sensing) with existing virtual reality mental health apps to enable personalisation of therapy.	NIHR £147,242 Mar 20 – Feb 21
Use of ICT by carers of people living with dementia London School of Economics and Political Science https://www.sscr.nihr.ac.uk/projects/p159/	Carers consistently report experiencing poor physical and mental health as a result of caring. Carers of people living with dementia may face considerable challenges due to the large number of hours of care provided and the cognitive decline of care recipients. Information and communication technology (ICT) such as memory devices and visual communication aids may be of particular value to people living with dementia and their carers. This study aims to provide evidence on patterns of ICT use by unpaid adult carers of people living with dementia; evaluate the effects of using ICT services on the health and wellbeing of carers; and develop an evaluation instrument to help local authorities to assess new technologies to ensure that they meet the needs of carers.	NIHR Sep 20 – Nov 22 £267,055

Bathing adaptations in the homes of older adults: A randomised controlled trial, economic evaluation and process evaluation (BATH-OUT-2) Newcastle University https://www.sscr.nihr.ac.uk/projects/p151/	'Walk-in' showers can be provided when people become unable to use the bath or shower at home. Adapting the bathroom often means that the person can continue to manage their personal care without help and are less likely to fall. There are often long waiting times for walk-in showers to be installed, during which older people may lose some of their independence with other daily activities, such as dressing, toileting or walking, that can follow difficulties with bathing. This study aims to establish whether or not the provision of walk-in showers is effective in improving or maintaining older people's health, safety, quality of life and ability to manage their personal care, and, if so, if quicker provision is more effective.	NIHR Dec 20 – Jul 23 £971,518
A randomised controlled trial and feasibility study of the effects of an e-health intervention 'iSupport' for reducing distress of dementia carers, especially in the ongoing pandemic of COVID-19 Bangor University https://fundingawards.nihr.ac.uk/award/NIHR130914	Caring for people living at home with dementia is known to have a detrimental effect on physical and mental health. COVID-19 has meant that many older people have had to self-isolate, placing increasing pressures on carers. This project is looking at whether carer distress is significantly reduced in participants who have access to the iSupport e-health intervention, an online learning and support programme for carers of people living with dementia. It will also explore the potential costs and benefits of iSupport and the feasibility of adapting iSupport for young carers. New knowledge regarding what may enhance or hinder the implementation of iSupport will be of benefit to collaborators at WHO by informing the international implementation of iSupport. The project hopes that iSupport will be embedded in care packages in the UK.	NIHR Jan 21 – Dec 23 £1,462,406

Earswitch: a new human: computer interface for augmentative and alternative communication Earswitch Ltd https://fundingawards.nihr.ac.uk/award/NIHR202509	The Earswitch device is worn in the ear, like an earphone, and can be used to control devices such as keyboards to help people with MND or cerebral palsy communicate more easily or for the first time. The project will initially develop the Earswitch to help people communicate, and will then progress the technology to help people control other technologies such as mobile phones and computers, with the long-term goal of having the Earswitch sensor in hearing aids or earphones that can be purchased on the high street.	NIHR Feb 21 – Jan 22 £149,995
Closed-Loop Electronic Stimulation (ES) – Mechanomyogram Sensor (MMG) System for Passive Tremor Suppression Treatment Serg Technologies https://fundingawards.nihr.ac.uk/award/NIHR202133	This project aims to develop and clinically test a simple wearable armband that senses and suppresses tremor by delivering tiny electrical stimulation (ES), which is not felt by the wearer, to the forearm or wrist. The armband may work indefinitely, offering the potential for constant tremor suppression. The team has already developed constituent elements of the system and proven their ability to sense and suppress tumour. This study has the potential to replace and/or complement current tremor treatment, eliminate side effects and improve quality of life for a very large patient population.	NIHR Mar 21 – Feb 23 £995,564
Revolutionary sensor for detecting faecal incontinence Oxford Optronix Ltd https://fundingawards.nihr.ac.uk/award/NIHR202460	The research team has developed a unique technology that can reliably detect when a person has passed a stool in an incontinence pad. It uses an optical sensor to detect small quantities of fluorescence light produced by the bacteria present in faeces. The technology can be easily inserted or woven into the manufacture of a standard incontinence pad, which is then simply connected to a thin, lightweight, wallet-sized, rechargeable, wearable monitor. The device alerts a nursing station or caregiver's mobile phone. This project plans to refine the existing prototype sensor and develop a thin flexible and reusable wearable monitor with wireless connectivity and develop a wireless recharging platform for continuous battery operation of the wearable monitor over several days.	NIHR Mar 21 – Feb 22 £149,238

Exploring language, behaviour and wellbeing outcomes of a user co-designed digital vocabulary intervention for child language disorder City, University of London https://fundingawards.nihr.ac.uk/award/ICA-CDRF-2018-04-ST2-029	This project will work directly with children who struggle with language and aspects of behaviour, together with their parents and expert professionals, to jointly develop and test a vocabulary intervention designed for use on tablets.	HEE/NIHR Jun 19 – Jun 23 £376,578
Developing an intervention to reduce sedentary behaviour in non-ambulant young people with long-term disabilities Birmingham Community Healthcare NHS Foundation Trust https://fundingawards.nihr.ac.uk/award/ICA-CDRF-2018-04-ST2-021	The aim of this study is to help young people with long-term disabilities who are unable to walk to spend less time sedentary. This will be achieved by developing a digital intervention (software) for mobile phones or computers to support these young people in reducing sedentary behaviour.	HEE/NIHR Jun 19 – Jun 22 £349,512
Homonymous hemianopia in childhood Great Ormond Street Hospital https://fundingawards.nihr.ac.uk/award/NIHR300562	The aim of this study is to better understand homonymous hemianopia (HH) in childhood and to evaluate the use of prisms on glasses for children with HH. Prisms on glasses for adults with HH have shown to be effective, but there is little evidence to support any sort of intervention in children. This study will first look at the clinical characteristics of childhood HH, and its impact on affected children's and young people's visual function and visual-related quality of life. It will then evaluate the use of prisms on glasses to help (re)habilitation of children with HH, with the hope of informing current clinical practice.	HEE/NIHR Jul 20 – Jul 24 £251,747

Scaling a digital support system to reduce workforce pressure Brain in Hand Ltd www.braininhand.co.uk	Brain in Hand (BIH) is a digital self-management support system used mainly by people who are autistic and have learning difficulties and mental health challenges. The system provides a unique combination of one-to-one human support and digital self-management technology accessed on a smartphone or other device that enables users to access help whenever and wherever it is needed. Through this, it helps people live more independently. Brain in Hand Ltd is now increasing access to its services by advancing the product's capabilities, and enhancing functionality, usability and the overall experience of users and service providers. It also aims to demonstrate the system's effectiveness in meeting needs in autism services.	NHSE Oct 20 – Oct 21 £99,486
Social AI empowering families for elderly support in the home Upstream Health Ltd https://bridgit.care/	Upstream Health Ltd has developed a solution called Bridgit™. Bridgit provides a unique ecosystem of products that support patients to take the actions needed to keep themselves well, reassure family members that all is OK and enable stretched care teams to provide focused earlier interventions. Bridgit uses Microsoft's AI capability and cloud services along with new hardware devices (home hub and watch) that are specifically designed to be accessible by an elderly population, supporting them to stay well for longer in the places they want to be.	NHSE Oct 20 – Oct 21 £582,417

Appendix

Assistive technology

> *'Assistive technology is any product or service designed to enable independence for disabled and older people.'*

The setting is any public setting where the user is interacting with the technology and the user has a disability or is older.

Inclusion criteria

- Technology or services that enable independence in people with disabilities or elderly people.
- All settings except clinical.
- Devices to support hygiene (e.g. drying devices 'carer dryer', shower chair).
- Self-management or devices to allow for social cohesion for older people or people with disabilities.
- Population-based/major infrastructure where the technology or service is for disabilities/ older people (e.g. tactile pavement surfaces).
- Technology/services that benefit people who are caring for people with disabilities/older people *[thereby giving indirect benefits to the person, e.g. delaying a move to a care home]*.

Exclusion criteria

- Clinical settings.
- Self-management of a chronic condition (e.g. diabetes).
- Assistive technology where the practitioner is using the technology (e.g. healthcare).
- Population-based/major infrastructure (e.g. street design, housing, transport) where the technology or service is not primarily for people with disabilities or older people *[even though they may benefit – scope too large]*.
- A medical device dwelling inside or under the skin that has been surgically inserted.

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Examples of assistive technology

- apps
- assistive technology
- balance technology
- bathing adaptation
- brain stimulation
- communication aid
- communication therapy
- computer game
- computer therapy
- computerised CBT
- digital reasoning
- electrical stimulation
- electronic magnifiers
- environmental assessment
- exercise programme
- gaming environment
- hearing aid
- heel cast
- humanoid robot
- internet-based treatment
- iPad
- Lego-based therapy
- mandibular devices
- mobile sensor
- neck collar
- night positioning equipment
- one-session therapy
- orthosis
- ostomy pouch
- rehabilitation device
- robot assisted training
- self-management programme
- sensor integration therapy
- shared decision making
- shower chair
- SMS
- socio-technical solutions
- standing frame
- step highlights
- support mattress
- symbol communication aid
- telehealth
- urinary catheter
- video feedback
- virtual reality environment

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