



Department
of Health &
Social Care

Research and development work relating to assistive technology

2022 to 2023

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2022 to 2023

Presented to Parliament pursuant to [Section 22 of the Chronically Sick and Disabled Persons Act 1970](#)

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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 the progress made in government-funded research relating to equipment that might increase the range of activities and independence or wellbeing of disabled people, known as assistive technology (AT). The reports are produced by the National Institute for Health and Care Research (NIHR).

This year's streamlined report summarises the progress made in the funding and uptake of AT in 2022 to 2023. As an added feature, readers can now access detailed information on all research activity via the [NIHR Open Data site](#), where a full list of funded studies can be searched by topic of interest and which includes links to project pages, study highlights and information on the inclusion criteria for this report.

Assistive technology: definition

Working with stakeholders, in 2001 the Foundation for Assistive Technology developed the following definition of AT:

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. This report covers not only specific AT products but also systems, combinations of technologies, and interfaces that enhance or increase the accessibility of services, such as internet-based solutions. The scope of this report also extends beyond physical health and includes research addressing the needs of those with mental health challenges, whether through innovative devices or online interventions such as behavioural therapies. Importantly, products and systems are considered to be AT when they place some level of control in the hands of the end-users. This emphasis on user empowerment sets aside ATs used exclusively in clinical settings or those that rely primarily on healthcare professionals, such as telehealth services. Although this report excludes surgical interventions such as hip replacements, it does include surgically implanted devices where the end-user retains control, such as cochlear implants.

This report's scope is intentionally comprehensive, aiming to include research that covers a wide spectrum of long-term disabilities and conditions. This extends to research on service delivery, patterns of AT use, technology development, and evaluations. Furthermore, this report highlights developments in priority setting, funding for AT research and innovation, and efforts that facilitate the uptake and spread of AT.

Glossary of governing and funding body acronyms used in this report

Term	Definition
DfT	Department for Transport
DHSC	Department of Health and Social Care
DLUHC	Department for Levelling Up, Housing and Communities
DU	Disability Unit
HCRW	Health and Care Research Wales
JLA	James Lind Alliance
NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health and Care Research
UKRI	UK Research and Innovation

Developments in priority setting and funding

This section highlights developments in priority setting and funding for AT research and innovation. It features examples of funding schemes either current or planned, and also action plans or service changes aimed at developing and improving AT use at the national level. This includes recommendations to shape the direction of future AT research, and any planned work arising from funded projects.

Department for Levelling Up, Housing and Communities

The [Department for Levelling Up, Housing and Communities](#) (DLUHC) is prioritising the accessibility of changing facilities for those with severe disabilities. The [Changing Places scheme](#) received an additional investment of £7 million, totalling £30.5 million, to build 120 new facilities across England. The state-of-the-art facilities offer essential assistive equipment, such as hoists and changing benches, and also space for carers, and will be allocated to parks, shopping centres, public buildings and train stations.

Department for Transport

The [Department for Transport](#) (DfT) is increasing the accessibility of public transport by requiring local bus and coach services to provide audible onboard travel announcements and visual displays for disabled passengers, in particular wheelchair users and those with hearing impairment. This change aims to increase confidence and independence of disabled travellers and is part of the [Inclusive Transport Strategy](#) to make all transport inclusive by 2030. With £4.65 million in funding, the DfT is also supporting small bus and coach operators to upgrade their vehicles to enable audio-visual (AV) aid-compatible alerts that can provide routes and directions and warn of upcoming stops and diversions.

Department of Health and Social Care

The [Department of Health and Social Care](#) (DHSC) continues to invest in AT as part of its 10-year plan to reform adult social care ('[Next steps to put people at the heart of care](#)'). The plan includes a £2.1 billion funding commitment over 2 years to improve adult social care and facilitate digital transformation in the sector. The focus of the plan is on digital tools for local authorities and NHS England providers, creating virtual care centres for 24/7 support and using technology for home monitoring. As an example, new systems will facilitate home care by allowing carers to access health information and medical records through a digital social care record, and virtual 24/7 care centres will help ensure that if people ever need help or reassurance they can access this from their homes, removing the need for regular checks and hospital visits.

Disability Unit

The UK government's [Disability Unit](#) (DU) operates within the Cabinet Office and focuses on eliminating barriers faced by disabled people in the UK. This entails understanding the experiences of disabled people and developing evidence-based disability strategies. In July 2022, a new [Disability Action Plan](#) was introduced to improve the lives of disabled people. This includes enhancing awareness of AT, implementing disability awareness training for public transport and setting up autism-friendly programmes for cultural sites. Moreover, a partnership with University College London aims to establish a [Global Disability Innovation Hub](#) for the advancement of assistive technologies (such as artificial intelligence (AI)-powered navigation aids and mobile communication).

Health and Care Research Wales

[Health and Care Research Wales](#) (HCRW) is currently funding 2 research projects to enhance the livelihoods, independence and care of people with dementia through novel technologies. The first, led by Swansea University's School of Health and Social Care, explores preventive social care practices for older people receiving home-based care, including those with dementia. This involves monitoring systems such as movement sensors, check-in telephone calls, and tactile technologies such as hug dolls and virtual pets to provide comfort and address behavioural issues. The second study, conducted at Cardiff University, concentrates on using AT to enhance cognitive function, movement and independence in people with the neurodegenerative disorder Huntington's disease. Building on promising pilot studies from 2014 and 2020, and using a larger participant group within controlled settings, this project investigates the use of a rhythmic drumming app, designed for home use, to improve concentration and brain connectivity.

James Lind Alliance priority setting partnerships

The [James Lind Alliance](#) (JLA) co-ordinates priority setting partnerships (PSPs) to identify research priorities based on the needs of patients and clinicians. These address various health conditions and emphasise effective strategies for supporting communication using augmentative alternative communication (AAC) technologies. Over 150 PSPs have been completed and they have helped to identify research priorities in conditions such as progressive pulmonary fibrosis and treatments such as skin cancer surgery. Priorities for future research have also been identified, including effective communication strategies for children and young people with neurological conditions, encompassing high- and low-technology AAC and speech intelligibility enhancement.

National Institute for Health and Care Excellence

The [National Institute for Health and Care Excellence](#) (NICE) plays an important role in setting priorities and guiding health and social care research investments. NICE commissions health institutions to produce evidence reviews, using the findings for recommendations or further research. In March 2022, one such review highlighted the potential benefits of gaze-based AT and multi-professional communication team access for helping disabled children and young people with complex needs. As a result, a recommendation was made to further investigate the effectiveness of different ATs in enabling these children to express their views to education,

health and social care services, which follows on from a previous recommendation (from February 2018) to evaluate the views and experiences of adults using social care services with ATs.

UK Research and Innovation

The number of people in the UK living with dementia continues to grow and will exceed 1 million by 2030. In September 2022, [UK Research and Innovation](#) (UKRI) announced that it will be investing £4.34 million into innovations in AI technology for people with dementia through the [Longitude Prize on Dementia](#). The technology should be capable of monitoring and adapting to the cognitive changes of individuals and support independence, and it can include monitoring devices, global positioning system (GPS) tracking devices, smartphone reminders and face recognition apps. In addition, Innovate UK along with other UKRI councils is funding a number of projects on diverse AT applications, such as mobility systems for vision impairment, gaming apps for hearing loss, wearable devices and prosthetics for pain management, and sensors for home monitoring.

Research current in 2022 to 2023

This section of the report is a brief summary of the government-funded AT research being delivered in 2022 to 2023 and refers to the full account of research activity now located on the [NIHR Open Data site](#). The research addresses a variety of challenges affecting the independence of older and disabled people and covers diverse areas of AT applications.

Adaptive and smart homes

NIHR and UKRI are jointly investing £7.56 million in research to advance adaptive and smart home technologies. These innovations, including home automation, smart sensors, light therapy (bioadaptive lighting) and virtual assessment tools, aim to help manage daily tasks, alleviate symptoms and support healthy behaviours, ultimately empowering individuals towards independence and self-management and reducing their reliance on care facilities and accident and emergency (A&E) services.

Breathing and sleep

Sleep issues related to chronic obstructive pulmonary disease (COPD) can severely affect an individual's daily life. Research funding of £2.5 million from NIHR is being used to explore AT for COPD management and improving related sleep issues, wellbeing and independence in affected individuals. This includes focusing on improving the comfort and effectiveness of breathing machines by using 3D-printed personalised face masks and introducing AI-based home monitoring technology and Bluetooth-connected sensors to provide 'early warning' of COPD symptoms along with an action plan for individuals.

Carer support and training

With NIHR funding of £1.8 million, studies focusing on the digital transformation of adult social care are exploring the impact of information and communication technologies and online learning and support programmes for care professionals on care quality – namely, the interactions between carers and service users and also carers' understanding of disabilities, digital systems and ATs.

Catheters

UKRI is supporting 2 research studies with funding of £344,125 to develop and test cost-effective catheter solutions that aim to provide greater comfort and promote a more active lifestyle for users while reducing infection rates and reducing costs for NHS England.

Communication and speech

NIHR and UKRI are investing over £1.7 million to develop ATs for individuals with speech disabilities. These projects focus on facilitating more natural and meaningful speech and conversations, and include the use of communication aids, AAC interventions and cost-effective earphones.

Exercise and rehabilitation

With nearly £3.6 million in funding from NIHR and UKRI, the research in this area aims to develop home-based exercise and rehabilitation interventions for older adults with frailty or osteoarthritis or who are recovering from injury. These interventions aim to equip people with the knowledge, skills and practices to support 'active ageing' and include interactive technology for daily strength training, digital tools to reduce sedentary behaviour, specialised knee devices and smartphone-based wellness programmes.

Gaming

NIHR- and UKRI-funded studies highlight the potential of gamification, machine learning and automation in developing ATs to improve the lives of socially isolated individuals and those with disabilities. With investments exceeding a total of £3.5 million, these projects include a digital auditory training program, a smartphone-based home care service and an educational computer game for children with social challenges.

Hearing impairment

Investments exceeding £11 million from HCRW, NIHR and UKRI are supporting numerous projects that aim to revolutionise hearing aid technology to enhance the lives of individuals with hearing impairments. Innovations include multi-modal AV hearing aids, music processing for hearing loss, and advanced hearing aid algorithms. Research covers tinnitus management, spatial hearing, adaptable hearing aids, quality prediction, cochlear implant improvements, and assessments for speech-in-noise comprehension.

Learning difficulties and autism

With £1.8 million in funding from HCRW and NIHR, multiple studies are assessing AT-based learning interventions to support people with learning difficulties. These studies investigate the potential benefits of smart speaker technologies, story-based interventions for managing challenging behaviour in children with autism spectrum disorder (ASD) and vocabulary interventions for children with language and behavioural challenges.

Mental and social health

Individuals with disabilities can require support to ensure their mental wellbeing and active participation in society. This is the focus of NIHR-funded research projects receiving £4.2 million to investigate innovations in mental health and social engagement support. Interventions include digital platforms for assisted therapy and telephone-delivered psychological treatments. The overarching goal of these interventions is to enhance the accessibility and quality of mental health services and reduce loneliness and social isolation among adults in community settings.

Mobility and musculoskeletal health

NIHR and UKRI are investing over £3.5 million into innovations in ATs that aim to empower older and disabled individuals to lead more independent lives through better mobility and musculoskeletal health. New technologies include sensory foot orthotics to enhance balance, mechatronic systems for material handling, transfer assistance aids for improved mobility, wearable robotic orthoses for upper-limb neurorehabilitation, knee braces to alleviate osteoarthritis pain and virtual reality simulations for safe wheelchair navigation practice.

Neurological and cognitive health

Most disabilities in the UK are caused by neurological conditions and brain injuries. Improving brain health, wellbeing and independence is the focus of research funded by HCRW, NIHR and UKRI, who together allocated over £5 million towards innovation in this area of AT. Projects are developing solutions that include reading aids, memory enhancement tools, home-based training, brain–computer interface devices for stroke patients, personalised care pathways for motor neuron disease, web-based rehabilitation apps and mobility solutions for Parkinson's disease. In addition, ongoing work includes app development for dementia patients and reading accessibility software.

Prosthetics and orthotics

Numerous projects have received over £8.6 million in funding from NIHR and UKRI to explore a broad spectrum of innovations in prosthetics and orthotics for people with limb loss. New technologies under development and testing include real-time sensor-based arms, lifelike robotics, adaptive knee joints and customisable prosthetics for children. Advancements in prosthetic hand-control algorithms, fingertip design and flexible sockets aim to transform prosthetic and orthotic technology to be more functional, adaptable and responsive.

Robotics

UKRI is providing research funding of £1.2 million for innovations in robotics to improve the wellbeing and independence of individuals with diverse healthcare challenges. This includes supernumerary robotic devices that can help with upper-limb tasks requiring bimanual co-ordination and AI-driven robotic devices that engage and assist dementia patients to enhance home safety and overall quality of life. In addition, there are efforts to foster collaboration among researchers, businesses, practitioners, policymakers and end-users to enable knowledge building and capability for healthcare robots to transform care for those living with frailty in the community.

Vision impairment

Several projects funded by NIHR and UKRI (totalling £2 million) highlight a diverse range of AT solutions to aid independence and healthcare accessibility for individuals with visual impairments or vision loss. These include a home glaucoma test, prisms on glasses for children with homonymous hemianopia, virtual reality-based solutions for visual field loss and near-vision glasses for babies at risk of cerebral visual impairment. In addition, smart canes integrated with smartphone applications and AI-driven visual agent technology aim to enhance individuals' mobility, navigation and social skills.

Wearable devices

Numerous projects receiving almost £3 million in research funding from the Chief Scientist Office of the Scottish Government Health Directorates, HCRW, NIHR and UKRI are focusing on innovations in wearable devices to assist with a variety of conditions that affect mobility. These innovations include a mobility-enhancing bodysuit embedded with joint-tracking sensors and a real-time digital twin avatar, a wearable armband that suppresses tremors using electrical stimulation, textile electrode cuffs designed for assisted walking, and wearable movement technology to monitor gait and/or possible progression of disease (such as Parkinson's disease). Also in development are wearable robotic technologies for children with cerebral palsy, splints for foot drop and aids for hand recovery after stroke.

Supporting uptake and spread of assistive technology

This section highlights some of the developments in government and research funding that have had a visible impact on supporting the uptake and spread of AT in social care. These include new implementations and changes in practice, policy and law.

Digital tool enhances quality of care and support for people living with dementia

The [InspireD app](#), launched in 2021, was designed for people with dementia and their carers. It stores photographs, music, and film clips to prompt conversations about past experiences and important life events. Initially developed at Ulster University as part of the Dementia eHealth and Data Analytics Pathfinder programme in Northern Ireland, the InspireD app is now marketed as a standalone support tool and is freely available for download on app stores and the [Apps4Dementia library](#). While initial study funding covered development of the website and dissemination activities, a second round of funding, and partnerships with various commercial organisations, has led to uptake and spread of the app to care homes and the wider dementia community. The app has since seen a steady rise in users from 1300 in February 2022 to 1810 in March 2023, with work currently taking place to further increase uptake in the care sector.

Cutting-edge prosthetics are now accessible to all on the NHS

NHS England has [introduced advanced bionic arms](#) that can replicate natural hand movements, offering a life-changing breakthrough for amputees. These innovative prosthetics are controlled by electrical brain signals, providing multi-grip capabilities that significantly improve daily tasks. The technology will now be accessible to all patients across England, not just military veterans, who were previously the sole recipients. This marks a significant step forward from basic prosthetic models and cosmetic options, with eligibility criteria focused on having sufficient residual upper-arm muscles to control the intuitive movements. Children aged as young as 9 years can benefit from these advancements, enhancing their play and learning experiences, with each patient undergoing a careful assessment to match the right prosthetic to their needs and capabilities. This development promises to transform the lives of many individuals across the country by enhancing their independence and overall quality of life.

New legislation enhances taxi and hire vehicle accessibility for disabled people

The recently introduced [Taxis and Private Hire Vehicles \(Disabled Persons\) Act 2022](#), effective from 28 June 2022, represents a significant milestone in improving accessibility for the 13.7 million disabled individuals in Great Britain (England, Scotland and Wales). This legislation

protects disabled people from being overcharged for taxi and private hire vehicle services. This Act amends the Equality Act 2010, imposing responsibilities on taxi and private hire vehicle drivers and operators to safeguard specific rights and protections for disabled passengers. The amendments include penalties of up to £1,000 for drivers who do not provide reasonable mobility assistance to pre-booked disabled passengers, and a requirement for drivers to provide assistance to visually impaired passengers in identifying or locating vehicles. Local authorities are also tasked with identifying wheelchair-accessible vehicles in their fleets.

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