Assistive Technology Changes Lives: an assessment of AT need and capacity in England

Final Report

Prepared by England CCA working group

This report was prepared by Global Disability Innovation (GDI) Hub for the Disability Unit in the Cabinet Office His Majesty's Government (HMG).

Grateful thanks are due to: Disability Rights UK, Scope, the British Association of Assistive Technology, Staffordshire University, Opinium, Policy Connect, the GATE team at WHO and all the participants that contributed their ideas and opinions.

GDI Hub is a research and practice centre driving disability innovation for a fairer world. Disability innovation is part of a bigger movement for disability justice, which disrupts current ideas and practice to create new possibilities. Operational in 41 countries, we work with more than 70 partners, delivering projects across a portfolio of £60m. GDI Hub has reached 28 million people since its launch in 2016 by developing bold approaches, building innovative partnerships, and creating ecosystems to accelerate change. GDI Hub at UCL was awarded WHO Collaborating Centre status in 2021.

Staffordshire University, at their Centre for Biomechanics and Rehabilitation Technologies (CBRT), has a globally leading expertise in Assistive Technology and clinical practice. CBRT has collaborations in various countries and has projects focusing on translational research and policy development. The centre conducted a smaller-scale rATA in the UK on behalf of the WHO in 2021.

The British Assistive Technology Association (BATA) represents AT suppliers, AT professionals and organisations who provide support to disabled people who need Assistive Technology solutions and hold a wealth of information on the UK's current assistive and accessible technologies available.

Disability Rights UK (DRUK) is the UK's leading organisation led by, run by, and working for Disabled people. DRUK works with Disabled People's Organisations (DPOs) and Government across the UK to influence regional and national change for better rights, benefits, quality of life and economic opportunities for Disabled people.

Scope is a disability equality charity in England and Wales, offering a wide network of disabled stakeholders and shop locations.

Opinium, our survey partner, is an award-winning strategic insights agency, built on the belief that in a world of uncertainty and complexity, success depends on the ability to stay on the pulse of what people think, feel and do. Also, it received the Market Research Society Awards Agency of the Year in 2021.

Executive Summary
Scope of work

The aim of this research was to undertake a Country Capacity Assessment (CCA) to inform a more integrated approach to Assistive Technology (AT) provision in England. The results aim to support policymakers in identifying actions to strengthen service delivery to better meet disabled people's needs, improving outcomes for AT users and reducing inefficiencies in the current approach.

The research was undertaken from November 2022 to March 2023 and led by the Global Disability Innovation (GDI) Hub, which is the World Health Organization (WHO) Global Collaborating Centre on AT access, using WHO tools in the Assistive Technology Assessment (ATA) suite.

Methodological approach

In this report, we draw on quantitative evidence from a 7,000-person nationally representative sample of disabled adults and children in England, supplemented by a 2,000-person short survey of all persons in England for comparison. Both surveys were conducted using existing panels held by Opinium. We also undertook stakeholder mapping, procurement data extraction, literature reviews, as well as the following qualitative methods: partner workshops, focus group discussions, and key informant interviews. For these, the WHO "5 Ps" for AT analysis (Policy, Provision, Personnel, Products, People) were a guiding framework. We then conducted an analysis of the data, identified themes from which we directly developed the recommendations. Our research was naturally limited due to budget, timescales, and the availability of data.

For the purposes of this research, AT is defined in accordance with the WHO's approach of products-plus-services:

> "AT is the application of organised knowledge and skills related to assistive products (APs), including systems and services", while defining assistive products as products that "maintain or improve an individual's functioning and independence, thereby promoting their well-being. Examples of assistive products include hearing aids, wheelchairs, communication aids, spectacles, prostheses, pill organisers, and memory aids" *(1)*.

Literature Review

This literature review considered extant knowledge of what comprises AT and who needs it in England. This review gives an overview of existing providers and funders of AT, including evidence of a discourse focused on improving access to AT as well as the challenges and current research trends for England. The review reveals the following challenges related to AT provision in England: workforce shortages; provision challenges including untimeliness; missing training and knowledge; economic conditions resulting in financial challenges; expense of some products; product acceptability; lack of research; and a significant impact of digital switchover.

Results

People

- The Nationally Representative Survey of disabled people found that **87% needed at least one AP. However, 31% of disabled people needing AP did not have access.**
- Unmet AT need among disabled people is **significantly higher in London (43% in London versus 31% Nationally).** Differences in gender, race and class are less pronounced than may have been expected.
- Unmet AT need was also higher for young disabled people (aged 2-17 years).
- When APs were provided, they profoundly impacted people's quality of life – **83% of disabled people said their AP was very important** at all times.
- Despite most AT being supposedly cost-free at public points of access to users in England, in reality the survey shows that most disabled people had out-of-pocket AT costs. **High costs are cited as preventing access to AT for almost half of the respondents – 45% stated 'cannot afford' as the reason they do not have AT.**
- From the qualitative findings, participants explained **how routes to attain AT were often complex, time-consuming, fragmented, and frustrating.**
- Across the data, there was a repeated sense of **resource wastefulness within the system, with repetitive assessments and burdensome bureaucracy common**.
- AT users were acutely aware of there not being "an endless pot of money" to provide AT, but they believed that **if their expertise was valued and they had more control, information, and choice over their AT options, this would reduce resource waste and improve their AT uptake, experience, and outcomes** – all while reducing demand on statutory services.

Policy

- Policy instruments such as the Equality Act (2010), Medical Technology Strategy, HMG Disability Strategy, and recent White Papers make **a strong case to address the 31% gap AT access.**
- This also relates to the UK's global leadership role in AT provision and technology innovation (including on Education Technology for export and UK Aid investment).
- Participants from our qualitative study identified the need for **more centralised practices to reduce regional inequity of AT access**. **It was felt that more collaborative and joined-up thinking was required** that spans education, health, social care, and other sectors to facilitate access and reduce economic and resource waste.

Products

- **By domain, the highest unmet need was for mobility APs.**

- The most frequently used APs (glasses, incontinence products, pill organisers) most often incurred an out-of-pocket cost, and their cost was the most cited barrier to accessing all APs.
- From the qualitative results, we find that **robust repair** and update systems are as essential as accessing the device in the first place. **Regional oversight** and technical in-house capacity to deal with issues could improve efficiency, cost-saving, and service provision.

Provision

- AT is not comprised of a single product or service, and data reveals the problematic lack of joined-up provision pathways.
- The AT landscape encompasses **many sectors, and coordination is poor, with AT delivery often treated as a low priority for budgets and service in each of these sectoral arenas.** Because of this, users frequently had to fight to make the system work cohesively to deliver them AT.
- We find and describe some domain-specific and regional promising practices through specialised service hubs, but these are limited in scope and not present everywhere or across all domains, reflecting systemic fragmentation.
- One particular challenge in conducting this research, indicative of shortcomings in the countrywide system, is a **lack of procurement data from government departments** that either don't track or struggle to find data on the AT they buy and deliver. In our limited interactions with the departments, it appears this is not from a lack of willingness to collect and track such data, but a lack of resources and structure.
- **Without such product procurement data, it is impossible to fully assess England's capacity to provide AT or to model any possible cost (in)efficiencies.** This is a significant data point itself in common with most developing countries but perhaps surprising in a high-resource country context such as England.
- **Similarly, AT service delivery pathways have proliferated across the system, but no one has a clear and complete picture of who can provide what to whom, when, and in what circumstances.**

Personnel

- Personnel are integral to AT provision. Across all sectors (education, health, social, charity, and more), they help create awareness and access, advocate for people's needs, and support the provision of devices with training and expertise. Yet, they are struggling under the weight of demand.
- Dedicated expert NHS Specialist Services for AAC and EC have helped to accelerate and enhance access for people with "the top 10% most complex needs", as one provider explained. **These were designed and funded to be "hubs" of provision, with local communication services acting as their "spokes". Yet findings from the KII and FGD tell us that these local "spokes" are missing, impacting provision.**

- Unless specifically prioritised by leaders, some **personnel can have challenges in keeping on top of their own learning and training in relation to the quickly changing innovations, devices, and funding streams in AT.**
- Alongside workforce shortages, **the lack of a professional network, CPD accreditation, or coordination mechanism** between sectors makes provision much harder.

Discussion

Below, we reference the London 2012 Framework, which was a retrospective mapping by GDI Hub of the successful disability inclusion approach taken for the London 2012 Games. We propose this as a model for delivering the necessary system changes to improve AT delivery, as we find commonalities in the current challenges, opportunities, and necessary actions. Our research suggests that the London 2012 model does not always follow in the exact same order when used for other projects, and as such our recommendations are structured in pragmatic terms according to what is possible in this Parliament and the next. Action across all 12 of the areas below is needed to drive change in AT access in England.

	Elements of Model	AT Articulation for this study
1	Community Priorities	Regular engagement, articulation and scrutiny
2	P/political leadership	Appoint a Tsar and assemble a matrix team

3	Mission	Commit to mission to reduce the AT access gap
4	Time Limited Actions	Disability action plan and white paper(s)
5	Governance	Panel led by disabled people
6	Diverse partnerships	Ensure all can contribute to success
7	Expert TA	Regular research and TA
8	Resources	Workforce support – coordination through Hub
9	Inclusive Innovation	Pilot repair centres & digital solutions
10	Good enough data	Commit to better, regular, data & evidence
11	Striving for excellence	Publish by region. Consequences for failure
12	Reflection & recognition	Celebrate success with public engagement

Recommendations

The recommendations are set out according to what might be possible immediately, in the remainder of this Parliament, and the next. As described above, each recommendation is linked to the London 2012 Framework to create a cohesive mission backed by tested practice. This is indicated by the square brackets e.g. [London 2012 – 3] refers to the third element of the model from the London 2012 Framework, (Figure 9).

Short-Term Recommendations

1. **Mission:** Announce intention to set a national mission to improve AT access. [London 2012-3]
2. **Leadership:** Appoint an 'AT Tsar' to take ownership of the agenda. [London 2012-2]
3. **Data:** Improve AT data to inform policy making and priorities. [London 2012-10]
4. **AT Hub:** Invest in an AT Hub, with regional spokes to build coordination and capacity. [London 2012-ALL]
5. **APL:** Validate Assistive Products List (APL) for England. [London 2012-8]

Medium-Term Recommendations

1. **Incentivise Coordination:** Disincentivise re-assessment and siloed activities and incentivise trust and co-operation between providers to build a collaborative, transparent service for AT access. [London 2012-6]
2. **AT User Passport:** Following models in other countries and sectors, trial an AT User Passport so assessments and other information follow the person, avoiding duplication of service. [London 2012-3]

3. **Better information between users and policymakers:** Create an AT users forum and embed this group into service delivery decision-making. [London 2012-5&1]
4. **Workforce Capacity:** Support and grow the AT workforce. [London 2012-7]
5. **Policy and NHS reform:** Maximise the PM's commitment to NHS reform, and current White Papers to deliver AT. [London 2012-4]

Longer-Term Recommendations

1. **Evidence:** Invest in the physical spokes and digital AT hub to collect better data, re-running the CCA assessment every 4 years. [London 2012-11]
2. **Export:** Showcase UK plc's AT capability, considering reducing tariffs on AT in any new trade deals. [London 2012-2]
3. **Repair:** Pilot and roll-out repair centres for AT by users and others. [London 2012-9]
4. **Celebrate Success:** consider cultural activities to celebrate success and engage public. [London 2012-12].

Conclusion

This report illustrates a complex state of AT in England. While delivery systems tend to provide quality products that have a strong, positive impact on people's lives, processes are often slow and stressful for users and providers alike. Startlingly, there is also an AT access gap of 31% of disabled people not having the assistive products they need to flourish, thrive, or even participate in daily life.

The evidence gathered suggests that acting on the recommendations set out above will most rapidly and efficiently cultivate change.

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Acronyms

AAC	Augmentative and Alternative Communication
ADLs	Activities of Daily Living
ALD	Adult with Learning Disability
AP	Assistive Product
APL	Assistive Products List
ATech	Assistive and Accessible Technology
AT	Assistive Technology
ATA	Assistive Technology Assessment
ATA-C	Assistive Technology Capacity Assessment
ATA-I	Assistive Technology Impact Assessment
BCF	Better Care Fund
BHTA	The British Healthcare Trade Association
CCA	Country Capacity Assessment
CCG	Clinical Commissioning Groups
CIL	Centre for Independent Living
EC	Environmental Controls
DFG	Disabled Facilities Grants
DLA	Disability Living Allowance
DPO	Disabled People's Organisation
DSA	Disabled Students' Allowance
FGD	Focus Group Discussions
GDI Hub	The Global Disability Innovation Hub
GReAT	Global Report on Assistive Technology
HMG	His Majesty's Government
HSE	The Health and Safety Executive
ICB	Integrated Care Board
IHS	Impairment Harmonised Standard

ICS	Integrated Care Systems
KII	Key Informant Interviews
NHS	National Health Service
NICE	The National Institute for Health and Care Excellence
OECD	Organisation for Economic Co-operation and Development
OT	Occupational Therapist
PIP	Personal Independence Payment
rATA	Rapid Assistive Technology Assessment
RiDC	Research Institute for Disabled People
SLT	Speech and Language Therapist
TIDAL Network+	Transformative Innovation in the Delivery of Assisted Living products and services
WHA	World Health Assembly
WHO	World Health Organization

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1 Background

The Cabinet Office's Disability Unit contracted Global Disability Innovation Hub (GDI Hub) to conduct an Assistive Technology (AT) Country Capacity Assessment (CCA) of England in late November 2022. The CCA scope was of England only to allow resources to stretch to a comprehensive piece of research, as a pilot for a potential broader UK wide report in future.

The following organisations supported GDI Hub in conducting this study: Opinium, Disability Rights UK (DRUK), Scope, Staffordshire University, and the British Association of Assistive Technology (BATA).

The World Health Organization (WHO) developed the CCA methodology (2). It comprises several validated tools developed within the GDI Hub-led AT2030 Programme[1].

AT benefits individuals, their families and society more broadly. It enables disabled and older people to complete activities of daily living and continue to contribute positively to society. Without AT, people lose independence and require additional care to live. AT is increasingly harnessing digital advances to provide new solutions and increased opportunities for disabled and older people (3).

Understanding the met and unmet needs of disabled people, the country's capacity to meet those needs and the impact of technology on the people who use it will inform the Disability Unit's work on Assistive and Accessible Technology (ATech).

This report returns the findings of this initial CCA study. It has been conducted rapidly, focusing on the needs of disabled people.

This report is organised as follows:

1. Background
2. Scope and Research Questions
3. Research Methodology**Methodological approach**
4. Literature Review Summary
5. Results
6. Discussion
7. Conclusions and Recommendations

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[1] https://at2030.org/

2 Scope and Research Questions

The aim of this research was to undertake a Country Capacity Assessment (CCA) to inform a more integrated approach to AT provision in England and support policymakers in identifying actions to strengthen service delivery to better meet disabled peoples' needs, improving outcomes for AT users and reducing inefficiencies in the current approach.

To fulfil the scope outlined, the following research questions are addressed for England:

RQ1. What are the **met and unmet population needs** regarding access to AT?

RQ2. What is the **country's capacity** to meet the identified (met and) unmet need?

RQ3. What is the **impact of assistive and accessible technology** on the people who use it?

The CCA was conducted using an iteration of the Assistive Technology Capacity Assessment (ATA-C), which included the rapid Assistive Technology Assessment (rATA) and the Assistive Technology impact assessment tool (ATA-I), all tools within the larger WHO Assistive Technology Assessment (ATA) Toolkit that is currently in development (4) these tools described in Table 1. These were complemented with two additional data sets:

- **UK Priority Assistive Product List**. The work to create this list was conducted by the British Association of Assistive Technology (BATA) in 2021, and the data was included as part of the corpus for this report.
- **Literature Review (desk research)**. Staffordshire University conducted a rapid literature review on current AT capacity and provision in England/UK.

Table 1: WHO ATA tools alongside tool description

Tools	Description
The Assistive Technology Capacity Assessment **(ATA-C)**	A system-level tool to evaluate a country's capacity to finance, regulate, procure and provide assistive technology. The implementation process can also serve to bring diverse stakeholders together and build momentum for action.
The rapid Assistive Technology Assessment (rATA)	A population-based household survey that measures the need, demand, and barriers to accessing assistive technology. The tool can be used alone, incorporated into broader household surveys or in national censuses

The Assistive Technology Impact Assessment tool (ATA-I)	A population-based household survey used to measure the impact of assistive technology on individuals. The tool is designed to collect information about the impact of assistive technology on a persons' empowerment, inclusion, participation, quality of life, dignity, and enjoyment of human rights. Note: this tool is still being developed and so GDI Hub incorporated elements of what has been established into the rATA.

To answer the developed research questions, we used the following data sources:

- RQ 1: rATA quantitative survey data, qualitative data from interviews, focus group discussions and data from Scope disability charity.
- RQ 2: rATA quantitative survey data, qualitative data from interviews, focus group discussions.
- RQ 3: ATA-I questions in the rATA survey and qualitative data from interviews, focus group discussions.

3   Research Methodology

The research methodology was designed in December 2022 and received ethical approval from UCL in January 2023. The data collection period for this research was limited to 5 weeks in January and February 2023 (due to the need to complete the work by 31 March 2023). The following section describes the research methodology in more detail.

3.1   The assistive technology capacity assessment (ATA-C)

The ATA-C is used to help understand the AT sector at national and subnational levels using the 5P framework: Provision, Personnel, People-Centred, Products and Policy, detailed in the Global Report on Assistive Technology (5) and illustrated in Figure 1. The ATA-C aims to assist local stakeholders in collecting information and use this to build a comprehensive understanding of a country's capacity to regulate, finance, procure and provide AT to meet national needs appropriately (2). The results can inform decision-making, strengthen the AT sector and improve access to AT (2) and, therefore, life outcomes for AT users.

Although the ATA-C can act as a stand-alone tool, it can also be complemented by the other tools in the toolkit (rATA and ATA-I). The combined information about need and impact, alongside analysing the existing capacity to meet that need, leads to better policy and programme design, particularly for procurement and service provision requirements (2).

For this report, an adapted ATA-C was developed with the components in Table 1. The collected information and materials from desktop research were analysed to develop the Country Capacity Assessment.

Figure 1: The WHO 5P people-centred assistive technology model, taken from Global Report on Assistive Technology

An ATA-C is conducted by an implementation team, which coordinates the assessment, identifying and interviewing AT stakeholders (2). GDI Hub led a consortium of partners with the implementation team comprising: GDI Hub, BATA, Disability Rights UK and Scope.

The implementation process brings diverse stakeholders together to build momentum for action. GDI Hub conducted focus group discussions and stakeholder interviews to ascertain the capacity of the UK to provide AT.

For this report the activities used for the core ATA-C are outlined in **Error! R eference source not found.**.

Table 2: Key activities undertaken and rationale for these

Activity (Method)	Rationale
Stakeholder mapping	To identify those who can contribute towards the current understanding of AT service delivery across the supply chain, including geographical representation across England and AT.
Government procurement evidence gathering	To gather data on current procurement and provision by Government departments and private sector partners.
Literature review (desk research)	Summarise evidence and evidenced gaps on the current AT capacity and provision in England/UK.
Stakeholder workshops	Space to validate the key themes and literature; identify participants for interviews and focus groups; validate findings and recommendations from the research.
Key Informant Interviews & Focus Group Discussions	To develop insights into the ability of the UK to meet the needs of AT users and the impact the current provision levels have on AT users.
Scope Data	To understand and identify existing information gaps through an analysis of what AT meant to users.
rATA	A population-based survey to measures need, demand, and barriers to accessing assistive technology.

3.1.1 Stakeholder mapping

GDI Hub conducted the stakeholder mapping exercises, in consultation with the project partners. The stakeholder mapping covered the five key components of delivery of AT services: People, Personnel, Provision, Policy and Products. Table 3 provides a list of stakeholders who were identified to be consulted as part of this research, specific names and organisations have been removed to maintain anonymity.

Table 3 Stakeholder Mapping across the 5 'P's

Stakeholder Mapping		
People (AT users)	**Provision**	**Personnel**
Disabled people across England representing different impairments, AT use, and geographical locations. • Hearing • Long Term & fluctuating conditions • Mobility impairments • Visual impairments • Memory Impairments • Learning disability	**Across products:** • Hearing Aids • Mobility / self-care aids • Wheelchair services • Communication services • Home Adaptations / controls **Across services:** • Locals Authorities • NHS • Private – CIC companies • Charities & DPO's	• Allied Health Professionals (AHPs) • Teachers • Headteachers • Teaching Assistants • Social Workers • Assistive Technologists • Paediatric to adult services • Leads across, training, personnel structure, qualifications, workforce strategy
Product		**Policy**
• Insurers / regulation authority • Entrepreneurs • Procurement services • AT providers across AT domains • AT sub-contractors within NHS • NHS supply chains • Product manufacturers and distributors		• Professional bodies • Think Tanks • Government departments • Civil servants • Independent advisors • Charities • Policy leads

3.1.2 Government procurement evidence gathering

GDI Hub requested the Disability Unit to facilitate connections within governmental departments to request various data sets which are necessary as part of the assistive technology capacity assessment (ATA-C). Requests were sent to governmental departments to provide information on finance mechanisms, procurement, and provision of assistive technology for the public by the State.

3.1.3 Literature Review (desk research)

A rapid review of literature was conducted. The primary objective was to demonstrate the present status of AT use, need, provision and policy in England. The authors recognise that despite their best efforts, there may be certain gaps in the document due to the limited availability or indexing of policy documents related to assistive technology in England.

3.1.4 Stakeholder workshops

Stakeholder workshops were held monthly. These workshops enabled sharing of project progress and discussions to validate key decisions to progress the research within the compressed time. These meetings were a space to validate the key themes emerging from the data sets, it was also used to identify participants from the key informant interviews and focus group discussions. Towards the end of the project, they were used to validate and refine the recommendations.

3.1.5 Key Informant Interviews & Focus Group Discussions

Stakeholders from the stakeholder mapping exercise were contacted to participate in 1-to-1 semi-structured interviews and focus group discussions. Both focussed on the 5Ps: People, Personnel, Provision, Policy, and Products (see Figure 1).

The participants were recruited through an expression of interest form circulated through GDI Hub and partner networks, and snowball sampling methods, (e.g., whereby interviewees recommended other participants to approach). The information sheet, privacy notice and consent forms were sent to each participant before the Key Informant Interviews (KII) or Focus Group Discussions (FGD). The discussions were recorded and transcribed with consent from each participant.

In total, 27 people participated in the KII and 31 people participated in the FGD, totalling 58 participants. Participants represented a broad range of organisational backgrounds, including user-led organisations and AT experience that spanned the 5Ps as outlined. Due to availability the number of interviews increased as these key stakeholders were unable to join the FGD. Discussions were transcribed using automated software and validated by the researchers on a secure server. Thematic Analysis was undertaken following Braun and Clarke (6), and MAXQDA software enhanced manual coding to support analysis.

A full list of participant professions, sectors of work and/or which AT they used can be found in Appendix 1.1-1.6. The official titles of the job roles, and organisations of participants have been amended to protect any possible identification. During the KII and FGD the discussions overlapped across the 5Ps - noting that many people could speak to multiple areas across AT provision.

3.1.6 Scope data

Based on a project that Scope undertook in 2022 to identify existing information gaps, an analysis of what AT meant to their users was explored. The data was collated from people calling into their hotline. The data was analysed by Scope and shared with the research team. We present an overview of the findings in 5.3.4. These findings correlated with the findings from KII and FGD findings and contributed to developing the recommendations.

3.1.7 Rapid assistive technology assessment (rATA) & ATA-I

The rATA is a population-based household survey that measures the need, demand, and barriers to accessing assistive technology. The tool can be used alone or incorporated into broader household surveys or national censuses. As mentioned, the ATA-I is still in development, therefore components of it were combined into the rATA to measure and assess the impact of AT on individuals. The question, "Please describe how impactful your assistive products are to your life in general", was included where free-text responses were provided. These are analysed and presented in 5.4 **Impact of assistive and accessible technology on people**. Opinium conducted the rATA data via online surveys capturing data from a minimum of 7,000 disabled people and 2,000 people from the general population, after adjustment for national representation for this research. GDI Hub subsequently analysed this data.

An adapted rATA was developed following the World Health Organization (WHO) format and was undertaken for England, utilising Opinium's extensive reach and capabilities. To meet clients' criteria of reaching 5,000-10,000 disabled people while meeting budget requirements, we adapted the survey to be carried out online, targeting individuals via an existing panel database held by Opinium and their partners.

Individual respondents were invited to complete the survey if they identified as having a disability either by:

1. the definition of disability used in the UK census.
2. by self-identifying as having a disability.

All categories from the Impairment Harmonised Standard (IHS) were also included at the end of the survey, providing a fourth metric for assessing disability and stratifying findings, in addition to the Washington Group Questions already utilised in the rATA.

Details of each of these definitions are provided in Appendix 2. Parents of disabled children responded to the survey on their child's behalf (if they were under 16 years of age). A smaller-scale top-up survey targeted at 2,000 general respondents (who were not required to identify as having a disability in any way to complete the survey) was conducted to estimate the prevalence of AP use and need in the general population and is now available to situate the findings of the rATA internationally.

4 Literature Review Summary

The full literature review version can be found in **Appendix 3: Full Literature Review**, which defines AT and outlines who needs it. This review provides an overview of existing providers and funders of AT. It also includes discourse concerning improving access to AT, the challenges for providing and current research and development relating to assistive technology in England.

4.1 Defining Assistive Technology, Assistive Products and Disability

The World Health Organization (WHO) defines AT as "the application of organised knowledge and skills related to assistive products, including systems and services", while defining assistive products as products that "maintain or improve an individual's functioning and independence, thereby promoting their well-being. Examples of assistive products include hearing aids, wheelchairs, communication aids, spectacles, prostheses, pill organisers, and memory aids" (1).

In the UK, APs can be classed as medical devices, regulated by the UK Medical Devices Regulations 2002, or an 'aid for daily living' (7) and assistive technology is defined by the UK Medicines & Healthcare products Regulatory Agency as: *"Products or systems that support and help individuals with disabilities, restricted mobility or other impairments to perform functions that might otherwise be difficult or impossible. These devices support individuals to improve or maintain their daily quality of life by easing or compensating for an injury or disability"* (7).

Under the UK Equality Act of 2010 (5) a person is disabled "if you have a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities."

4.2 World Health Assembly AT Resolution (WHA 71.8) and Member State obligations

The 71st World Health Assembly (WHA) adopted resolution WHA71.8 in May 2018 (8), which advised all WHO Member States, including the UK, to work towards improving access to assistive technology. Within the resolution, it requested the WHO to prepare the Global Report on Assistive Technology, which outlined the "benefits of investing in assistive technology often outweigh the cost, both on an individual and a societal level" (5) .

4.3 Assistive technology: need and prevalence

From the recently published Global Report on Assistive Technology (2022) we know that one in three people, or more than 2.5 billion people require one or more AP, and that as the global population ages and the prevalence of non-communicable diseases increases, this number is expected to grow to over 3.5 billion by 2050 (5). Results from population surveys in 29 countries conducted for the report found that 10%-69% of people need APs.

In 2021, a WHO scoping review of AT coverage to understand prevalence of need and access to AT across Europe (9) included 103 publications of which 30 were UK-based, thus being the most represented country covering all six functional domains: vision, communication, hearing, cognition, mobility and self-care. Prevalence ranged from 0.02% (of the total population) to 60.8% across the domains.

We also know that disabled people are likely to require access to assistive technology. According to the recent Family Resources Survey (2020 to 2021) (10), the number of people who reported a disability in England is *12.2 million* (22% of the population), an increase of 2.8 million from 2010 to 2011 (9.4 million) (11). The total number of people who reported a disability in the UK was **14.6 million**, with prevalence higher among older adults (42%) and working-age adults (21%), and lower among children (9%). Mobility impairment was the highest reported impairment (46%), followed by stamina/breathing/ fatigue (33%) and dexterity (23%). Other data, such as from TSA in 2020 (17), show that **1.7 million** people rely on technology-enabled care; 0.5% of the UK population require augmentative and alternative communication (AAC) (12) and that there are **579,067** people accessing wheelchair services in England (13).

We can also use prior surveys to attempt to estimate need. For example:

- It was reported in 2020 that 59% of people in the UK wear glasses (14), equating to approximately 39,589,000 people if extrapolating from the Office of National Statistics (15).
- It was recently reported (2023) that 2 million people use hearing aids in the UK, but that a further 6.7 million could benefit from using them.
- The English Housing Survey 2019 to 2020 found that around 1.9 million households in England had one or more people with a health condition that required adaptations to their home (16,17).

Disabled people are less likely to be employed (48%) compared to non-disabled people (80%). The government has acknowledged that assistive technology can contribute to removing barriers to work for disabled people (18). Furthermore, the latest figures show that **2.8 million** people in England and Wales are claiming Personal Independence Payment (PIP), a benefit provided by the government to people with a long-term physical or mental health condition or disability who have difficulty doing certain everyday tasks or getting around because of their condition (19).

4.4 Need, demand, supply and user satisfaction with AT in England

In 2021 an initial UK rATA was conducted following the WHO guidelines (20).Of the 259 respondents, most resided in England. The survey found that most respondents had no difficulty (78.4 – 95.1%) with mobility, hearing, communication, cognition, and self-care. However, 43% reported 'some difficulty' with their sight. The majority of respondents (77%) of adult respondents did not identify as disabled, but 70% were currently using APs. For respondents who reported using AP, the top three were spectacles (38%), hearing aids (6%), and grab bars/handrails (5%). Most AP

(73.9%) were purchased from the private sector. Over half (57%) were paid for out-of-pocket (by adults), and 22% were provided through government sources (mostly for children). Most respondents who used APs (72%) had spent an average cost of ±£340 - £423 (in 1 year), ranging from £10 to £3,000.

Most respondents reported high satisfaction with their APs, AT services, repair, maintenance, and follow-up. The main reasons for dissatisfaction with APs were fit/size/shape, replacements needed, and durability. The main reasons for service dissatisfaction were quality of care and waiting time. An unmet need for APs was reported by 18.5% of respondents, with adults 65+ years having the greatest unmet need (37.5%). "Cannot afford" and "Lack of support" were the most cited barriers to accessing APs.

4.5 Provision and funding mechanisms for assistive technology in England

The public, private and non-profit sectors are assistive technology providers in England and the UK. The British Healthcare Trade Association (BHTA) is the UK's largest association of companies manufacturing and selling AT, with over 400 members. Whilst not an exhaustive list, 25 non-profit organisations involved in assistive technology provision in the UK are listed in the 2022 Assistive Technology report based on the UK (21).

The UK Equality Act 2010 (22) states that employers are required to make "reasonable adjustments", which includes access to relevant AT and the Health and Safety Executive (HSE) has created a set of principles aimed at assisting employers in facilitating the employment of disabled people, as well as helping them to maintain their positions (23).

An overview of the **public sector provision of assistive technology in England** shows that the government provides full or partial funding for many APs and services under health, social care and support, education, housing, and employment schemes. These include:

1) the **National Health Service** (NHS), a publicly funded healthcare system that provides comprehensive healthcare services to all people living in England. The Health and Care Act (2022) (24) resulted in significant changes to the structure of the NHS to deliver joined-up (integrated) care for people who rely on multiple different services.

2) **NHS Trusts** across England provide assistive technology to people through various services, including those provided by allied health professions.

3) NHS England commission Specialised Assistive Technology Services (25) which are provided through several organisations.

4) Digitising social care fund (26) introduced in 2021 provides funding of £8.2 million received from the NHS Transformation Directorate (NHSX) to support the digitisation of social care.

5) Better Care Fund (BCF) (27) programme which supports local systems to deliver the integration of health and social care, aiming to reduce the barriers often created by separate funding streams.

6) Personal Independence Payment (PIP) (28) scheme which is available to help with extra living costs if people have both a long-term physical or mental health condition or disability, and experience difficulty doing certain everyday tasks or getting around because of their condition.

7) **Disability Living Allowance (DLA) scheme** which now serves people under 16 years of age and those born on or before 8 April 1948.

8) Access to work (29) scheme is available to help people get employment or stay employed if they have a physical or mental health condition or disability; which includes the provision of assistive technology. The assistive products included in the scheme comprise literacy support software, speed recognition software and adapted equipment.

9) Disabled Facilities Grants (DFG) (30) - a grant (up to £30,000 in England) available from local authorities for people with a disability who need to make changes to their home.

10) Disabled Students' Allowance (DSA) (31) which serves to support disabled students with additional costs they may face in higher education because of their disability, including assistive and accessible technology.

4.5.1 Improving access to assistive technology in England

Various reports suggest that access to assistive technology in England is sporadic and inconsistent, with significant regional variations in the availability and provision of assistive technology (20,32). This is also reflected in policy documents such as the NHS Long Term Plan (33), which recognises the need to improve support for individuals with long-term conditions. The plan stated that the NHS would support these individuals through access to mobile monitoring devices and connected home technologies.

Recent publications on AT in England and the UK, highlighted some issues with AT service provision and suggesting recommendations: 1) In order to provide quality telehealth and telecare, technological advances should be underpinned by following a user-centred approach to design and delivery (34); 2) Awareness campaigns and appropriate funding mechanisms can reduce barriers to uptake of telehealth care devices (35); 3) GPs, and all doctors involved in the care should be equipped with the relevant AT knowledge to ensure their patients receive appropriate information and support, as currently knowledge is gained from personal experience rather than from health and social care professionals (36); 4) Standardising appointment times across the NHS and providing guidelines on product entitlements could reduce large discrepancies in waiting times for appointments and orthotic products (37); 5) The installation of induction loop systems to improve accessibility, as well as staff training for those who work at reception desks and in-patient waiting areas in NHS hospitals

(38); 6) AT is an under-utilised intervention in education, recommending coordinated efforts from all stakeholders (39).

There have been a number of government initiatives to improve access to AT, such as 1) the Disability Survey in 2021 (40) to inform the UK Government's National Disability Strategy (41) outlining actions to improve the everyday lives of all disabled people and charted a commitment to explore the establishment of a world-leading Centre for Assistive and Accessible Technology and to assess the assistive and accessible technology needs of disabled people in England; 2) The government confirmed that a new Disability Action Plan would be consulted on and published in 2023 (42) which would set out the action the government will take in 2023 and 2024 to improve disabled people's lives; 3) The government published a series of white papers, including People at the Heart of Care (43), which set out a 10-year vision for how they would transform support and care in England; highlighting a number of benefits of assistive technology for people in need and essentially requesting commissioners, integrated care systems (ICSs) and NHS partners to integrate technology into their care and support plans; 4) A report in February 2023 titled "Adopting the right technology to transform social care" (44), was published to help local authorities and ICSs identify funding options effectively; and 5) In February 2023, the Department of Health and Social Care published its first-ever medical technology strategy (8), which included AT. It outlined three key objectives, the right product, at the right price, and in the right place (8).

The challenge of improving access to AT is not isolated to England, but a global issue (5). To enable the tracking of improvements, the WHO (in 2022) published a set of indicators to measure Member States' progress up to 2030 (8). These indicators measure system preparedness in terms of governance; legislation; public budget; financing mechanisms; regulations and standards; collaborations and initiatives; service provision coverage; workforce availability; and training. They also highlight the need for AT provision to shift from the medical (focus on impairment) to the social model of disability, which considers the broader social and environmental factors impacting access and participation- promoting a more inclusive society that recognises and accommodates diversity, rather than marginalising and stigmatising disabled people (45).

4.5.2 Existing challenges related to AT access in England

Several challenges exist that impact quality AT provision, such as:

Workforce shortages in health and social care – Almost every healthcare profession is facing staff shortages with the number of vacancies also increasing in the adult social care sector. Vacancy rates of 9.7% in the medical and nursing sectors of the NHS are reported, with 165,000 vacancies in adult social care (46). Contributing factors include lack of long-term workforce forecasting; Brexit; concerns over pay; job pressures; too few staff being trained etc. (46).

Issues with assistive technology provision systems – Complicated processes and a lack of knowledge about processes among potential users for accessing

assistive technology, as well as a lack of coordination between various delivery mechanisms have been reported in Europe (9).

The untimely provision of assistive technology – The OECD reported in 2019 that since 2008, the UK health system budgets have not kept pace with the growing demand for services, leading to increased waiting times and provider deficits (47).

Lack of knowledge and training related to assistive technology – One of the main barriers that impact AT provision is the limited knowledge among and within the training of healthcare professionals and other frontline staff (9), as well as lack of awareness of the available range of AP and services (20).

The current UK economic climate – A recent publication (2022) by BHTA reported that companies are facing financial challenges following the pandemic, global supply chain delays, and uncertainty in the post-Brexit regulatory transition, with one-third considering staff retrenchments and 29% changing focus to international markets thereby placing a drain of healthcare jobs in the UK. Companies are seeking financial support, greater regulatory certainty and less bureaucracy (48).

Financial affordability of assistive technology – Financing AT is often reported as a barrier to potential users with more than half of AT users paying out-of-pocket for their AT (20) .

Acceptability of assistive technology – The use of AT can draw attention to otherwise invisible limitations, with some people afraid of stigmatisation from using assistive technology, particularly hearing aids (9,20,48).

Lack of research on assistive technology – Healthcare professionals often identified the lack of robust research evidence as a key reason for not recommending AT to their patients (8). A key recommendation was the need for researchers to agree on standards for data collection to assess the prevalence of the need for AT.

Impact of the digital switchover on assistive technology services – By 2025 all analogue phone lines will be switched off across the UK (61) which creates an issue as most of the critical alarm connectivity in the UK relies on analogue technology. This has implications for AT, e.g. failed calls to alarm-receiving centres used by disabled people and the cost of replacing analogue with digital devices (49).

4.5.3 Research and development relating to assistive technology in England

There have been various initiatives to increase and improve research and development, as well as innovation relating to AT, such as 1) The National Disability Strategy (63) reporting on the significant support for innovation in the development and improved access to ATech; 2) the UKRI investment of £58.4 million in research and development related to AT, and 3) the Industrial Strategy Challenge Fund which invested £1.4 million in assistive technology projects, also investing up to £1 million to develop a new world-leading Centre for ATech; 4) The Department for Business,

Energy and Industrial Strategy committed to "challenge UKRI and other research stakeholders to use future innovation challenges to accelerate innovation in assistive technologies" (64), and 5) The AT research and development work: 2020 to 2021 report (65) on government-funded research to improve equipment for disabled and older people highlighted developments in priority setting and funding; 6) ATech Policy Lab launched to design an evidence-based policy that makes technology enabling for all. There are multiple research centres dedicated to various clinical areas that specialise in AT for specific medical conditions, such as the Centre for Assistive Technology and Connected Healthcare at the University of Sheffield, amongst others, and Collaborations such as Transformative Innovation in the Delivery of Assisted Living products and services (TIDAL Network+).

Additional developments include GDI Hub at University College London becoming the first official Collaborating Centre for the WHO on Assistive Technology in 2021, leading key work on humanitarian response, digital technology and artificial intelligence, service provision models. GDI Hub lead the £40m (£19.8m of funding with £20m matched funding) AT2030 programme, an assistive technology innovation programme funded by UK Aid.

4.6 Summary

This review of the literature provides an explanation of key terminology, an overview of Member States obligations in relation to WHA 71.8, describes the need and prevalence as related to AT, both globally, regionally, and then, more specifically for the UK. A nuanced description of the need, demand, supply, and user satisfaction with AT in England is provided, as well as an overview of the provision and funding mechanisms for AT in England. Suggestions are provided to overcome barriers regarding improving access to AT in England in response to the existing challenges being experienced, and finally a synthesis of recent research and development relating to AT in England is shared. This review on recent research and policy documents offers an evaluation of the current state of AT in England. As outlined in this review, while data is not available to show a complete picture, there is a significant need for assistive technology across the population in England.

5 Results

5.1 Introduction

This section presents the results from our rapid assistive technology assessment (rATA) survey, the qualitative key informant interviews, and focus group discussions. We have presented the findings by research question. These findings are discussed in Section 6 followed by the recommendations and conclusions in Section 7.

We report on two surveys. First is the 'top-up' survey of a representative sample of the English population, not just disabled people. Second, the survey of disabled people.

The 'top-up' survey was completed to allow for international comparison to other rATA data sets. The Global Report on Assistive Technology (GReAT) (50) included findings from 29 countries, most of which are low and middle-income, which had conducted the rATA survey with nationally representative samples. Combined, these samples include 323,647 participants, of which 51.2% were female, with 32.6% aged 0-17, 54.2% 18-59, and 13.2% 60+. The GReAT analysis found that globally, AT need ranged from 9.9% to 68.9%, while use ranged from 2.9% to 68%.

England's population is older than the global average, yet the prevalence of AP need falls toward the lower end of the range reported in the GReAT report. The population also has a high prevalence of AP use that falls just within the GReAT use range.

5.2 Survey Result: need, unmet need, use and barriers

To explore the met and unmet population needs in terms of access to assistive technology in England, we present findings from the rATA. We also report details of use and barriers to access. This is complemented with data from key informant interviews and focus group discussions, along with findings from a project by Scope, who outlined information gaps and access concerns.

5.2.1 Need and unmet need: assistive products

The rATA survey measures the difficulties people have in everyday functioning across domains. These domains are mobility, vision, hearing, communication, remembering/cognition, and self-care.

The survey data of disabled people was adjusted to ensure it represented the population of England. The data from this representative sample (7,253 respondents) showed that many people had difficulties with mobility (63%), vision (57%), remembering/cognition (50%), self-care (47%), hearing (37%) and/or communication (24%).

Nearly half (45%) of the population surveyed need an assistive product using the WHO definition (i.e., a person reported their level of difficulty as 'a lot' or 'cannot do' in any domain of functional difficulty).

Nearly all (87%) of respondents used one or more APs, and 31% reported an unmet need for one or more AP. This may include not having a necessary AP or needing repairs, updates, or adjustments for a current AP that is not fulfilling its potential for the user.

Table 4 shows variations in these key indicators— Need, Use, and Unmet need— across key demographics. Notable findings are:

- There is high unmet need among younger ages compared to older age groups.
- Unmet need for people aged 2-17 years is over twice as high than the 65+ age group (51% and 25%, respectively).
- There was less variation across gender groups.
- London has an exceedingly high need compared to other regions in England. For example, 34% of the London population needs products to aid hearing (11% was the level of need in the next highest region). This trend was continued for other domains – 37% of Londoners need communication aids (compared to 4% in the next highest region), 38% of Londoners need remembering or cognition products (compared to 15% in the next highest region), and 42% of Londoners need self-care products (compared to 16% in the next highest region).

The regional differences of need are shown in Figure 2: Map of England showing regional differences in need as percentages of the population.

Source: ONS Open Geography Portal, ONS

Figure 2: Map of England showing regional differences in need as percentages of the population

The details of the need, use and unmet need can be seen in the appendices: *Table 5: AP access indicators by key* demographics, *Table 6: AP use by key demographics* and *Table 7: AP unmet need by key demographics*.

Categories	Overall row totals	AP Need Total	AP Need Percent	AP Use Total	AP Use %	AP Unmet Need Total	AP Unmet Need Percent
Overall	7253	3288	45%	6313	87%	2217	31%
Age Group							
2-17	570	384	67%	493	87%	289	51%
18-64	4530	2009	44%	3775	83%	1422	31%
65+	2128	885	42%	2022	95%	495	23%
Gender							
Female	4058	1732	43%	3545	87%	1192	29%
Male	3120	1517	49%	2701	87%	989	32%
Non-binary, Intersex, or Other	59	33	56%	51	86%	26	44%
Ethnicity							
Asian	183	69	38%	146	80%	59	32%
Black	71	28	39%	51	72%	22	31%
Mixed	129	51	40%	104	81%	40	31%
Other	22	8	36%	16	73%	3	14%
White	6773	3091	46%	5979	88%	2060	30%
Social Grade							
Middle class	3582	1564	44%	3084	86%	1169	33%
Working class	3671	1724	47%	3229	88%	1048	29%
Region							
East Midlands	641	260	41%	569	89%	167	26%
East of England	636	265	42%	563	89%	174	27%
London	1181	696	59%	996	84%	508	43%
North East	398	194	49%	351	88%	112	28%
North West	949	459	48%	841	89%	290	31%

South East	1159	471	41%	1024	88%	337	29%
South West	838	342	41%	736	88%	220	26%
West Midlands	742	306	41%	613	83%	189	26%
Yorkshire Humberside	709	295	42%	620	87%	220	31%
Disability definition							
ONS	7240	3283	45%	6310	87%	2215	31%
IHS	6145	3128	51%	5495	89%	2048	33%
Self-identify	4073	2489	61%	3732	92%	1540	38%
WHO need	3288	3288	NA	3079	94%	1397	43%

Table 4: AP indicators by key demographics

*Office of National Statistics definition used.
**Impairment Harmonised Standard definition used.
***Self-identification of having a disability used.
****WHO definition of needing AP used.

5.2.2 Use: Assistive Products

Survey respondents used 53,567 assistive products, averaging 7-8 APs per person.

Glasses were used by 4,625 respondents or 64%. However, participants also reported the highest unmet need for glasses - 7% of people needed but did not have suitable glasses. As their use is much higher than any other AP, glasses is removed from Figure 3[2], which lists the next most used and most needed APs. Often, these categories overlapped – many APs with the highest use also had the highest unmet need, for example, grab-bars/hand-rails, canes/sticks, and chairs used for the shower/bath/toilet.

Figure 3 also shows a high ratio of unmet need to use for mobility products, especially electric wheelchairs, manual wheelchairs with postural support, and club foot braces, for which their unmet need exceeds their usage.

The full table is provided in the Appendix: *Table 9: Device use and unmet need.*

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[2] The removal of glasses is common practice in research spanning multiple AP types when there is an extremely high proportion of glasses compared to other APs (5).
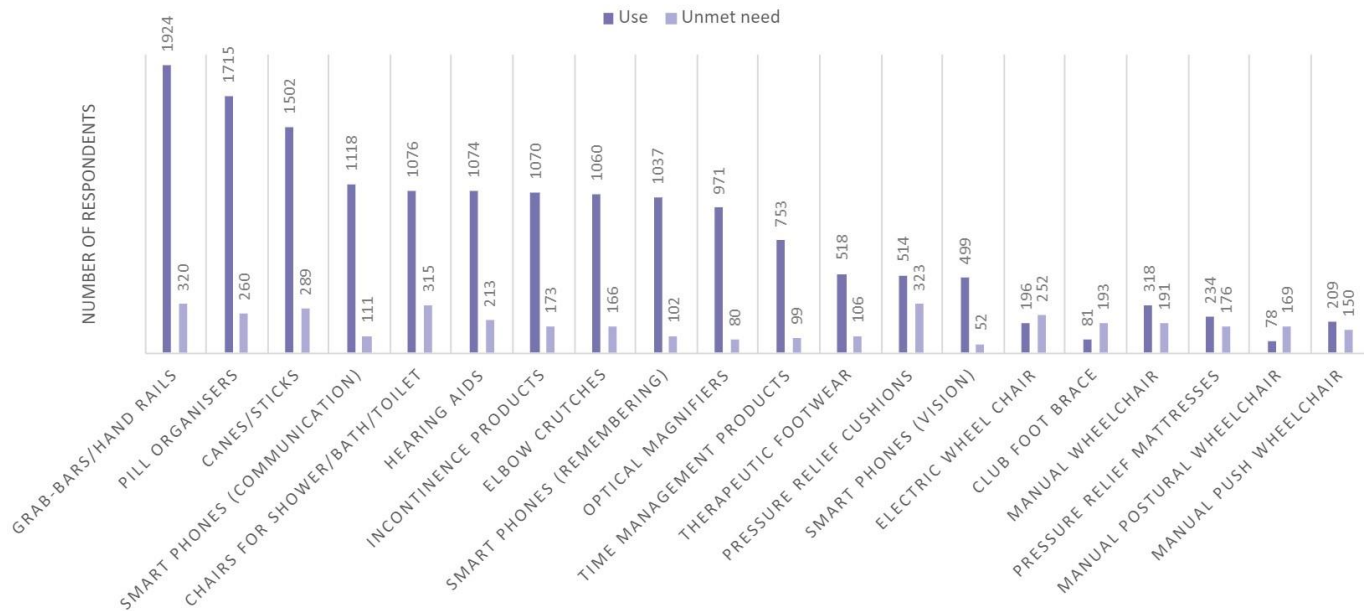
Figure 3: APs with highest rates of use and unmet need

5.2.3 Barriers to assistive product access

Participants with an unmet need (n=2217) were asked why they didn't have the APs they needed. They could select (multiple) barriers from eight choices. There was also the option to add a barrier.

Respondents most often cited 'cost' as their main barrier – 998 respondents (45% of people with unmet need) stated they 'cannot afford' the AP they need. For 417 respondents (19% of people with unmet need), a 'lack of support' was also a barrier. For 373 respondents (17% of people with unmet need), 'stigma/shyness' prevented them from accessing APs.

Working-class respondents (53%) more often cited affordability as a barrier compared to middle-class respondents (38%). Among male respondents with unmet need, 18% identified time as a barrier, 15% identified availability, and 14% identified suitability and transport. In comparison, female respondents cited these barriers less than half as often, but more frequently cited affordability (53% compared to 36%).

Barriers had the widest variation across different age groups, which is illustrated in Figure 4. Respondents in the 2 to 17-year age group had the highest unmet need overall, and cited availability, suitability, transport, time, support, and stigma as barriers more often than respondents in older age groups. However, only 2% of young respondents identified awareness of APs as a barrier to access. Adults in the oldest age group (65+) most often wrote-in 'other' barriers (30%, n=147), 24 of which mention waiting on assessments, (16%). The full barriers table is available in *Table 8: Barriers by key demographics.*

Legend: ■ 2-17 ■ 18-64 ■ 65+

Y-axis: RESPONDENTS WITH UNMET NEED

NOT AVAILABLE: 29%, 8%, 5%
NOT SUITABLE: 22%, 9%, 6%
LACK OF TRANSPORT/TOO FAR: 21%, 8%, 5%
LACK OF TIME: 26%, 11%, 5%
LACK OF SUPPORT: 26%, 20%, 10%
CANNOT AFFORD: 34%, 50%, 37%
STIGMA/SHYNESS: 26%, 18%, 9%
DO NOT KNOW ABOUT APS: 2%, 10%, 13%
OTHER: 1%, 7%, 30%
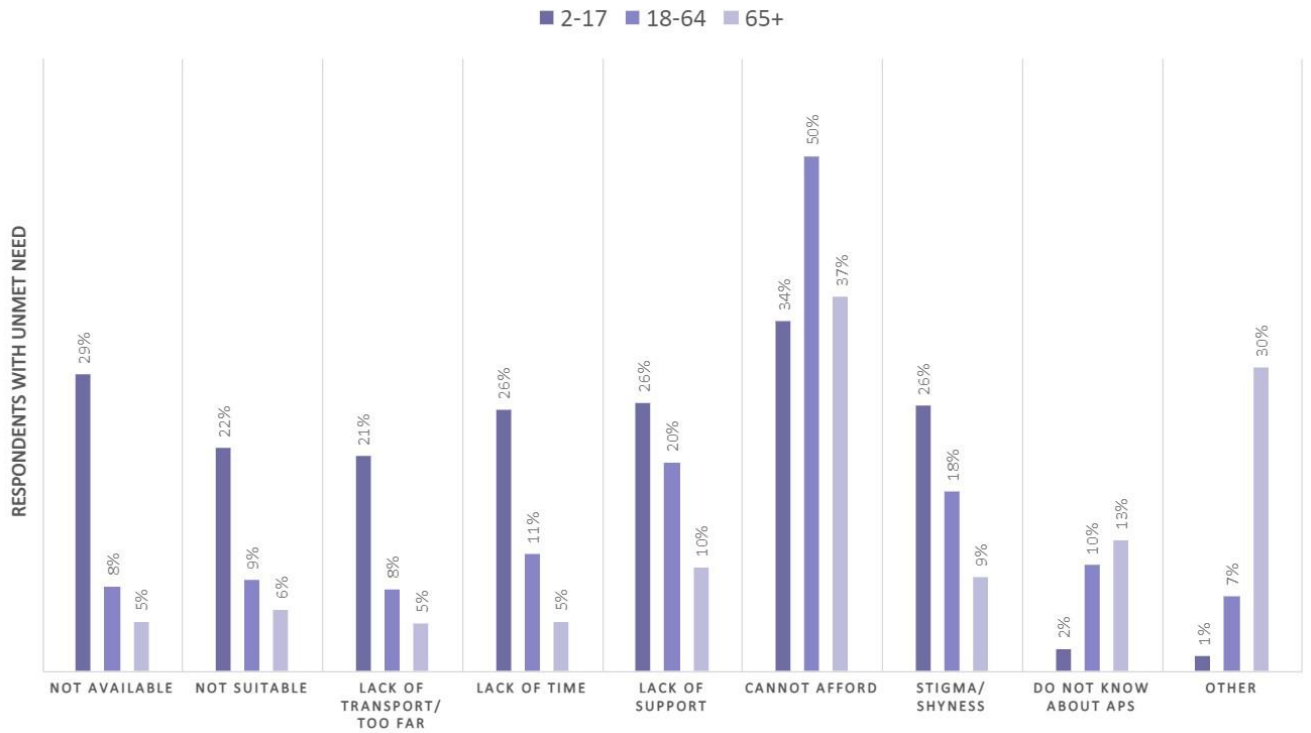
Figure 4: Barriers identified across age groups.

There was less variation across ethnicity, definitions of disability, and regions, except for London. Here, 'not available', 'not suitable', 'lack of transport/too far', and 'lack of time' were consistently identified more often than the next highest region, with a difference of 10% or greater. Alternatively, 'cannot afford' was identified the least often in London, at 34%, while it was reported by 45-51% of respondents in all the other regions. In most cases, increasing levels of functional difficulty corresponded with increasing frequency of citing all barriers, except 'do not know about AP', for which the inverse was true; participants with lower difficulty levels were less aware of APs. In the hearing and communication domains, respondents reporting 'a lot' of difficulty more often cited lack of availability and lack of suitability as barriers than respondents reporting 'cannot do'.

5.3 Country's capacity to meet the identified (met and) unmet need

We present our main and in-depth findings to explore the country's capacity to meet the identified met and unmet need of AT. We intended to include data on procurement however were met with barriers, discussed in 5.3.1. The survey contributes to an understanding of how assistive products were used and how they were sourced and importantly how these products were financed. We also present the first-hand lived experiences of the many diverse stakeholders involved in the providing, accessing, and using of AT. These findings are categorised thematically to provide details about the factors and considerations that facilitate and the factors that hinder the country's capacity to fulfil the met and unmet need of AT.

5.3.1 Procurement – Zero Central Data

In conducting this research, the project team shared a questionnaire, based on the WHO AT Assessment for Capacity (ATA-C) model, with many Government Departments in January 2023 to request information about the type, number, cost, and frequency of AP procurement. Zero data points were returned. The research team can state that at the time of the research, following the access protocols instructed by the client, no data about UK procurement of AT products was available or shared. A typical response from a department with a lot of responsibility for AT procurement and distribution was:

> "Our administrative system is extremely limited in the information it provides ... As a result of these limitations, we are unable to identify or understand what items the funding from our department is providing. This is an ongoing struggle we have had and there are no alternatives at this time to gather any information surrounding the types of equipment including AT that our funding provides."

> "Our Team does not hold any data on the impact of the assistive technology that is supplied via a Non-Medical Help provider."

> "I'm afraid we don't hold the sort of data you're looking for at such a granular level."

Due to the absence of central data, we are unable to provide an analysis on the current procurement and provision by Government departments and private sector partners. However, we do have BATA's attempt to generate the first assistive product list for the UK. BATA undertook a survey and subsequent consensus-building processes to enable those using and developing assistive technology to contribute to a list of the essential assistive products so that UK policymakers, users, and service providers can plan, procure, and provide them even more effectively. Details of this are found in *Appendix 4: BATA Assistive Product List*

Despite this lack of central knowledge, there are best practice examples of a national-level reporting on AT provision. NHS Digital has spearheaded centralised data sets such as the National Wheelchair Data Collection dataset (13), which is given as a case study.

Case Study: National Wheelchair Data Collection

The case study is taken from the National Wheelchair Data Collection website (13).

In 2015/16 NHS England introduced the first centralised national wheelchair dataset about wheelchair services. It was designed to improve transparency and benchmarking. This was essential to improving the commissioning of wheelchair services and, similarly, to improving outcomes for wheelchair users.

Design of data collection tool

The data collection questions were developed through significant discussion and feedback from wheelchair service providers, people who use wheelchairs, the National Wheelchair Managers Forum, Clinical Commissioning Groups (CCGs), and other key stakeholders.

Data Collection

Data was collected quarterly from CCGs between July 2015 and June 2022, since July 2022 data has been collected from Integrated Care Boards (ICBs).

Data Importance

This data supports the drive for improvements in wheelchair services. The collection has been published as official statistics since quarter one of 2019-20 (April – June 2019).

5.3.2 Survey results – England's capacity to meet the need

Respondents indicated all APs they used and were asked to provide information for up to three of their most important APs. Information for 12,961 of these 'primary' devices was collected. Respondents could select multiple sources and payers for each AP, so a 'source' or 'payer' listed does not necessarily mean the AP was fully covered by that source or payer. However, certain sources and payers were more often cited as contributing to specific APs, indicating variation in who covers the cost, based on the type of AP needed. Full tables for payers and sources are included in Appendix 10.

Presently, respondents most often source their primary APs from private sector facilities and stores (58%, n=7554), which are most commonly glasses, pill organisers, and incontinence products. Government/public facilities (25%, n=3215), most often providing standing frames, crutches, limb prosthetics and orthoses, were cited as the second, followed by friends/family (10%, n=1234).

We provide a snapshot of two institutional payers compared with out-of-pocket costs in Table 5: Who pays for AP? listing the top 15 APs for each, with complete lists of APs by payer and source in Tables 10 and 11, respectively. Most APs (60%, n=7770) were paid for in part or entirely by out-of-pocket expense. The government was a contributing payee for 24% of APs (n=3130). The government most frequently acts as the payer for lower limb prosthetics and orthotics, hearing aids, and elbow crutches. Communication aids, like deafblind communicators, video communication devices and software, braille displays and writing equipment, and communication boards were often contributed to by employers and schools. Most users of pill organisers and incontinence products (82% and 81% respectively) had to pay some portion of out-of-pocket for these products.

APs with government payer	Government total	Government percent	APs with employer/school as payer	Employer/school total	Employer/school percent	APs with out of pocket (self) as payer	Out of pocket (self) total	Out of pocket (self) percent
lower limb prostheses	6	75%	deaf/blind communicators (vision)	13	57%	pill organisers	681	82%
hearing aids	442	67%	deaf/blind communicators (hearing)	9	53%	incontinence products	343	81%
elbow crutches	324	63%	club foot brace	9	45%	time management products	186	79%
walking frames	32	56%	alarm signallers	35	42%	spectacles	2892	78%
lower limb orthoses	32	50%	braille displays	18	40%	smart phones/PDAs for memory/cognition support	237	76%
upper limb prostheses	2	50%	video communication devices	12	38%	pressure relief cushions	142	71%
standing frames	1	50%	braille writers	22	37%	optical magnifiers	193	70%
keyboard/mouse software	4	50%	audio player	15	36%	canes/sticks	644	67%

spinal orthoses	9	47%	communication software	24	35%	pressure relief mattresses	69	63%
chairs for shower/bath/toilet	174	47%	gesture to voice technology	12	32%	smart phones/PDAs for vision support	102	61%
therapeutic footwear	94	43%	recorders	17	32%	rollators	96	60%
fall detectors	17	42%	watches	29	32%	smart phones/PDAs for communication support	223	58%
grab-bars/hand rails	316	41%	communication boards/books/cards	15	32%	electric wheelchair	82	57%
manual wheelchair	51	40%	smart phones/PDAs for hearing support	27	23%	travel aids	20	57%
gesture to voice technology	14	38%	manual postural wheelchair	4	20%	upper limb orthoses	62	56%

Table 5: Who pays for AP?

Further, satisfaction ratings were applicable to assessment/training services for 8,043 primary APs, and repair/follow-up services for 7,310 primary APs. Respondents reported being quite or very satisfied with the assessment/training they received for 70% of these APs, and with repair/follow-up for 63%.

5.3.3 KII and FGD Results: England's capacity to meet the need.

We present six key themes from the KII and FGD data, these were: 1) Workforce & Training, 2) Device, Innovation & Maintenance, 3) AT Awareness & Uptake, 4) Provision Infrastructure, 5) Impact Data, Evidence & Accountability and 6) Budget Responsibilities & Priorities. These themes provide rich accounts of the lived experiences captured during the KII and FGD that help to describe the current landscape of AT provision in England. The themes are presented below with supporting quotes from across our participant pool. Each theme presents two aspects:

1. Capacity to meet AT need: Characteristics and qualities that facilitate AT provision.
2. Challenges to meet AT need: Challenges hindering capacity to meet the defined demand.

Theme 1: Workforce & Training
Overview
England has a passionate and collaborative workforce in the AT space, with professionals who care deeply about their work and its impact. Unfortunately, the country faces serious workforce challenges that limit capacity to deliver AT, such as a shortage of personnel and a lack of accreditation and training.

Capacity to meet AT need
Passionate Personnel
AT professionals exhibit determination and passion for their work. They enjoy interacting with patients and seeing their work's impact on improving the quality of life of those they work with. These individuals often go above and beyond to deliver services, even in the face of limited resources, capability, and time. They are a key driving force in the continual provision of AT. In the words of one consultant in rehabilitation medicine:

> "I feel like I have to do something, you know? Then that I feel personally responsible and my patient is in front of me and they're struggling and you can see, even if I take it back to a medical model, that deteriorating anatomically physically, and you want to step in and be involved. I'm saying I need to get this wheelchair reviewed, otherwise this person's going to end up under the spinal surgeons."
> [P22]

Collaboration
We also find many examples of small teams working well together, trying in earnest to collaborate, work cohesively, and break down disciplinary silos that often emerge in the fragmented provision system to impede product delivery. In one focus group,

an NHS clinical lead explained the benefits of collaboration despite systemic challenges:

> "We problem solve together, and we try and find solutions for incoming referrals. I think one of the challenges to that is that our time scales work slightly differently [across different sectors and centres that deliver AT], so getting the timings right so that we can both go in at the same time and always produce the best solution." [P29]

Some AT professionals also share and provide training with one another. Here, an AT manager shares how they share expertise across disciplines:

> "For my colleagues in the spinal centres, we'll run in-service training for occupational therapists. We do it for the consultants within the spinal centres if they want to have a briefing on what's possible and what we do." [P24]

Challenges to meet AT need
Personnel Shortages

One of the capacity concerns within the domain is a shortage of personnel. Many organisations find themselves unable to fill vacancies, citing a lack of qualified candidates. There is also an ageing AT workforce, creating further concerns about personnel once existing workers begin to retire and exit the field, potentially worsening an already-acute shortage.

This shortage is largely because England's AT provision system was created to serve a much narrower demographic than the collective of individuals who need AT today. An ageing population, medical advances that enable people with complex health conditions to live longer, and an expansion in available technologies to serve the needs of these populations have caused the scope of the sector to widen dramatically. These factors in tandem with other events such as the COVID-19 pandemic have led to a workforce that cannot keep up with AT demand. One independent consultant who has worked in AT delivery systems around the world told us:

> "Obviously no, we haven't got enough people. The reason we haven't got enough people is because we've got a system that was designed decades ago, when we supported a tiny minority of the people were trying to support now." [P11]

Lack of Accreditation and Training

An additional issue with respect to personnel is the lack of formal accreditation for people who work with AT. Professionals working in this area are not provided with sufficient training on the increasingly wide spectrum of AT products and increasingly complex system of provision. A speech and language therapist shared:

> "A lot of local therapists provide toilet seats, hospital beds, ramps, showers, those kinds of things, but ... they don't really get training

about alternative access to computers or alternative access to technology and speech therapy. It's only about one day in a three-year course, that is on Augmentative and Alternative Communication device (AAC)." [P21]

With the concerning absence of focus on digital AT, and currently only one known post-graduate degree on educational assistive technologies in the UK, organisations are forced to develop and provide their own training for staff, or rely on suppliers to support the integration and provide further training of AT to users and providers. Recruitment difficulties are directly related to this lack of training, says an AT manager:

> "It's very hard to recruit because they're not there. In fact, we've never found anybody who's really got the right experience to work in spinal. There is some overlap with other places, other technologies, but it is difficult to recruit. We are looking more for people's ability to work with the patients than to work with the technology, because with the technology we can teach people." [P24]

Summary

Within the theme of Workforce and Training, England's strengths include a largely dedicated, caring, and hardworking group of AT personnel who often collaborate to ensure that people with health conditions or impairments can access the products they need. Still, these efforts are undermined by personnel shortages and an overall lack of accreditation and training in the field.

Theme 2: Device, Innovation & Maintenance

Overview

This theme captures findings related to AT devices themselves, exploring the wide range of products on the market and terminology around what is considered AT. We find that England's strengths in this area lie in its large product range and innovative "reuse and recycle" programs, while challenges include stakeholders struggling to keep up with the ever-changing product landscape, cost barriers to users, limited choices in public provision, regulatory uncertainty, and maintenance shortcomings.

Capacity to meet AT need

Product range

England's AT product market is far more diverse than in most countries, with a variety of devices available across both high and low technology solutions. We found energy and excitement about innovations which have created more options than ever before for disabled people to live inclusive and independent lives. The quotes below from our participants share a few of these experiences:

> "We've got a couple of children in school with funded devices at the moment, one on the autistic spectrum and one with cerebral palsy. And they take the [communication devices] home, and the difference they have made to the children's lives and the family's lives is just -- it's not measurable, really." [P6, Headteacher]

"Technology is amazing these days." [P1, Teaching Assistant]

"We're constantly innovating, and for me one of the things that makes it exciting at [organisation name is that] … we're a global company with input from across the world. So, we quite often see innovations coming into our products that have come because of a problem or a or something that somebody's seen in a different part of the world, but actually that innovation benefits people in England and the UK as well." [P26, Manager]

This sentiment was not limited to high-tech solutions alone. Clinicians and users emphasise the need for low-tech devices as well, because they can be more quickly adopted by family members, act as a safety-net when high tech solutions break and can be more appropriate when working in certain environments. As one clinical technologist noted:

"You know, everyone gets excited about the high tech [devices] and obviously that's what we're funded for, but in reality, if they have a skilled communication pod [of people that surround them], oftentimes a spouse or parent, they're going to use that low tech. That is just so much faster and so much more intuitive with a human on the other side." [P10]

Another clinician who is also a prosthesis user shared similar feelings:

"[I'm] not complaining about the low-tech devices that I was offered, because actually I'm using those low-tech devices with a few embellishments of my own now, because they're safe to use. You can predict exactly what they're going to do. They are all body-powered, so the power you put into a device more or less equals the power you deliver at the terminal device end. So I'm safe to work with patients. That's something." [P3]

Specialist centres and dedicated professionals across sectors felt that they could keep up with the latest innovations and devices on the market. This was facilitated through strong relationships with AT suppliers, who are motivated to share latest advancements with providers. This relationship is mutually beneficial; professionals are kept up-to-date, and suppliers have an avenue to try, test and market their products. One researcher and AT user told us:

"The people that make the technology are quite happy to come and train us for free -- because of course they are, because we're going to recommend this stuff. So they will come and do a little workshop periodically." [P28]

The expansive nature of the term "Assistive Technology" came up often in discussions with participants, with devices mentioned ranging from pill organisers, adapted toilets, hoists, and walking sticks to bespoke adaptations and more advanced communication aids. Access to "mainstream" tech products, including

Kindles, mobile phones, and voice assistants such as Amazon Alexa's, featured throughout several discussions. The "mainstreaming" of AT functions like speech-to-text has led these mainstream devices being used as AT solutions that are sometimes more affordable and intuitive to implement. Below, two AT users share their experiences with mainstream products as AT:

> "I enjoy reading, but I really struggle with physical books. So I have a Kindle, and that opens up reading for me, in a very easy way. [It's] very mainstream easy to access." [P25]

> "I have [an Amazon] Alexa which I'm finding quite useful, and I actually put that on my personal health budget [to fund] because it's a way of accessing the phone with your voice. Because I can't, unless my PA puts my mobile phone in my hands … I can't access a phone." [P42]

Recycling and Reuse Systems

Also promising are recycling and reuse systems which provide economic savings. This model is particularly present in Specialist AAC centres who, because of their regional catchment area and in-house expertise, were able to re-use devices for the next client, clearing it of previous data. Manufacturers of specialist equipment were also considering their role within AT recycling structures, with the need to build robust devices that can withstand multiple users:

> "We don't do recycling as in taking the devices back and giving them to somebody else. But we know a lot of our customers do, and that's a big consideration actually, when developing devices, is to make sure they're good enough quality to be able to be passed between people. Because that's a good cost efficiency for a customer." [P26, Manager]

> "We're constantly recycling that high-cost equipment and realising quite significant savings on the back of it ... We're estimating overall we're realising cost efficiency savings in the region of between 30 and 40% of the of the total cost of the device, which is quite significant." [P14, NHS Specialist Services]

Challenges to meet AT need
Struggles to keep up with changing landscape

Despite many specialist professionals feeling like they could keep up with the expanding and innovative device landscape, other professionals and many users struggle to do so. Service providers with less specialist expertise felt they were falling behind and their capacity for provision was suffering because of it. In one case, this was noted by an orthotist who felt that they didn't have any clinical influence on the decisions of what products are available to purchase as they were not working directly with the supplier:

> "I think the bottom line is, you know we don't have the capacity to negotiate and fund these materials and joints, so where we feel as

clinicians that we're following falling further and further behind. - [P3]"

Similarly, an AT user and director of a prominent charity expressed his personal and professional dissatisfaction with the difficulty of finding products across the large and fragmented market:

> "[We need] what I've referred to as an industry catalogue. What you want, ideally is a single point of entry, which very clearly shows Where these disparate entities are, who they are, what they offer. I mean, I've got one because I've made it. But for my own purposes and for my organisation, I mean just so that we know. You know, there are 250 suppliers in this business. They sometimes sell the same stuff, sometimes different stuff. But ... it's disparate." [P12, Director of AT Services]

There were also noted challenges with product updates, mostly in AT software. Manufacturers described the complexity of trying to deliver an update, providers spoke about the support then required from the service to cope with the update, and users described the impact and frustration that updates can have on their use, rendering it confusing and incompatible with other devices:

> "It really can be quite mind-blowingly difficult, and sometimes an update is critical because if you don't do it, things will break. So sometimes the update isn't forced by like a development that we've done. Sometimes the update is forced by a development that's happened on iOS or windows… The way that we update has changed constantly over the years and I would well imagine it will continue to change." [P26, Manager]

> "The worst thing you can do to a piece of software for someone who's cognitively challenged is move the furniture without telling us. Because we're reliant on our long-term spatial memories to know how to get places. So if they do an upgrade and things move I know my productivity has gone through the floor." [P28, AT User and Researcher]

Cost barriers to users

Although the mainstreaming of technology was found to be generally positive, helping to drive costs down, it was noted that more expensive, higher-end devices sometimes have the necessary features for people with more complex disabilities, and these remain unaffordable for many people.

> "The first thing is whether somebody's got a device to use. And the other question is whether that device is up to scratch. Unfortunately, some of the features that I've talked about are only available on the latest and greatest, and obviously the latest and greatest phone is usually hundreds of pounds. A lot of hundreds of pounds instead of

just a couple of 100 pounds. So a lot of people don't have a phone that will have the right features in." [P24, Manager]

"it's just prohibitively expensive to buy yourself." [P53, Senior Member of Staff, Disability Charity]

Limited choices in public provision

While there was a noted breadth of possible AT solutions, there was a reported limited choice of devices available via public funding pathways, with the *"one size fits all"* approach causing disabled people to dislike their products. Limited choice about what product would best serve needs caused disabled people to feel like their opinion and expertise within AT was not heard or valued. In the words of one AT user:

"The one [shower chair] they offered to replace my old one with is huge and it would mean that my wheelchair couldn't get into the bathroom … [The option provided] was like a one size fits all. And because I said no to that, there was nothing else. [P25]"

Providers also spoke about the limited choice of some bespoke devices, which caused no bargaining power when organisations raised their product costs:

"You may have to say yes to any price that they could give you, practically. One day they could say okay, this is £5000. Three months later, they could say now the price is £6000. And you need to say 'okay, perfect.' You needed to buy it. I don't have any other option." [P18, Home Adaptations Charity]

Regulatory uncertainty

A rising cost of devices is also impacting both providers and users. Prices were reported to be increasingly soaring in recent years, after the COVID-19 pandemic and with the wider changes happening within UK and global markets. AT providers find it more difficult and time consuming to get hold of products with devices and parts purchased outside the UK or returning to the UK post repair being held up at customs:

"You get stuck in customs. Customs couldn't care less that you can't speak. So we have to put in place more loan devices so that we send loan devices out to people while they were away for repair. But then if something gets stuck in customs on the way back, then our whole calendar of loan devices gets thrown out of whack because we can't get the device back to the customer". [P26, Regional Manager of AT supplier]

The current uncertainty surrounding device regulations, and funding changes from leaving the European Union (EU) was noted by participants to be a deterrent to innovation, especially within smaller organisations who were needing to channel resources to paperwork and who had previously been dependent on EU research funding to develop AT:

"The impact that has as a small business or as an organisation [is that] there's less money and time and resource to go into innovation on the products, because you're doing paperwork and you're having to find a European distributor and you're spending more on things. … We were working with researchers across Europe, looking at how we can implement their findings around pathological speech … the impacts for both assistive technology but also for other areas. And after last week we were saying that's not going to happen anymore." [P43, Speech and Language Therapist and Director]

Maintenance shortcomings

Participants also identified challenges in device repairs and maintenance which had a costly and timely impact on the supply chain and AT users who were responsible for follow-up costs:

"The wheel on the chair had literally broken off, and then she had books underneath it to keep it level so she could still use it. … [AT provider] obviously came out and condemned it, because they couldn't repair it. But it took forever." [P19, OT in Local Authority]

"Whilst funding is often there for the initial purchase, it's often not there for the servicing and repairs to maintain it" [P25, AT user]

"So like automatic doors, you get the funding for that but then there's no follow up. So if things go wrong with the automatic doors, you face bills of 100s of pounds, the same with through floor lifts, once it's out with a warranty, that individual then has to fund sort of that, whereas really there should be some sort of ongoing, free service, because they're quite expensive." [P55, Senior Member of Staff, Disability Charity]

It was evident across this theme, that the device itself is one part of AT provision. There needs to be clear routes of access, a deep and holistic understanding of the users wishes and needs of the device, which facilitate choice alongside robust and responsive repair systems to facilitate efficient device uptake. In the words of the participants, the focus should not be on the device itself but on the "features and functions" that allows for liberation and control.

"And we need to shift our rationale away from for purchase and provision away from format and design towards, features and functions. What features and functions you need are available at best price on this device. That is the one we should pay for." [P11, Independent AT Consultant]

"And you know, the point about what is it that supports disabled people to become independent and have choice and control. Let's not start with categories of equipment. Let's start with what liberates us and gives us more control over our lives." [P56, Policy Lead, Disability Charity]

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Summary

The Device, Innovation, and Maintenance landscape of AT in England benefits from a wide range of quality products and emerging innovative practices like reuse and recycling programs. However, serious challenges persist including stakeholders' difficulties to keep up with the quickly changing array of products, limited product choices available via government-funded pathways, growing regulatory uncertainty and a lack of sufficient maintenance schemes.

Theme 3: AT Awareness & Uptake

Overview

Nearly all of the participants were very knowledgeable in AT products, services, and accessibility to AT (which we acknowledge is on part due to the bias of the sample). However, it was discussed and noted that the general population awareness of AT was critically absent in wider circles. In this theme we outline how AT awareness can critically affect the country's capacity to meet the unmet need of AT.

Capacity to meet AT need

Informed providers, suppliers, & developers

As partially mentioned in the above section on devices, AT professionals tend to be knowledgeable about the diverse types of AT that exist. However, in addition to holding knowledge, they are also key to spreading awareness to others. This is true in terms of device range as well as the complex bureaucratic pathways to access AT for their users.

Other key players for awareness include suppliers and developers. They often showcase products at conferences and exhibitions with users and providers alike. These spaces are key junctures where awareness spreads, as people can often see new products tested or try them. Still, suppliers and developers report difficulties in spreading awareness given the fragmented nature of the market:

> "[suppliers] have to spend so much time and money reaching the clients, there's no easy way for them to reach the clients they serve. So a lot of it is face to face marketing show and tell, turning up at the right exhibitions or home or employment sector, you know, coming to the office, coming to your home and showing you and hoping you're going to buy it." [P12- Director of AT services]

Peer networks & media coverage

One of the strongest networks for dissemination of information is among users of AT. Communities of users often learn from one another and are eager to share their experiences to support peers and help prevent digital or other exclusion:

> "I suppose peer support, and finding information out through my peers, is one of the best ways [to get awareness of AT] because you really can trust. And they understand your situation." [P42, AT User]

Users also shared the practise of connecting with other people who had similar impairment or condition as them, but were more progressed in that condition, in

order to be aware and prepared for what was to come, and how AT products could support them:

> "I found a lot of useful technology through that a way that is not open to everyone, but with a progressive condition you can find someone who is ahead of you and they have solved all kinds of problems that you are probably going to spend lots of time trying to solve yourself." [P33, AT User]

Many users share their experiences and seek expertise in online forums among one another. Such conversations centre around what products are useful, how to access them, and what funding and support was available. In fact, participating professionals with whom we spoke reported frequently learning from users about AT services. This wealth of knowledge was highly useful and needs to be acknowledged as a credible and valuable source to improve awareness of AT.

Awareness towards AT also seems to increase when media depictions of AT use are shared widely. This not only increases the awareness of available products, but it creates a demand and acceptance towards these sometimes-bespoke products and increases uptake.

Whilst the Covid-19 pandemic was highly detrimental for many, a beneficial impact was the large scale and quick adoption of technology for communication and working practices. This enabled and supported AT users to be able to access and justify their need and use of AT for work and social needs. There was also an escalation of adaptive and accessible features in existing technology that encouraged wider participation and inclusivity, which further increased the awareness of AT products. However, whilst there has been tangentially beneficial for AT users, there is still a necessity to keep the focus and attention on AT services more widely:

> "In the NHS there's been, a huge increased in visibility of the profession, because a lot of them actually designed a lot of COVID related stuff, but again, it's but it's raised it in such a way that people like me are still invisible because the NHS now just thinks that clinical technologists are all COVID people." [P10, Clinical Technologist]

Challenges to meet AT need
Difficulties in keeping track of available products

Apart from those professionally immersed in AT, there is a significant lack of awareness of products and services which can directly impact uptake. This is compounded by personnel's limited capacity, which means that they tend to not have time to explore many products with users, or to inform and educate themselves and others about new and upcoming AT.

One clinical specialist OT expressed their frustration with the way the provision system disadvantages AT users without specialised AT knowledge:

> "People who've got the knowledge then can influence what they get [from the provision system], because they can be canny about it. Whereas Joe Bloggs down the road wouldn't know that. And it feels very unfair." [P13]

Providers also shared that families of users are often unaware of products and therefore unable to advocate for their need. Some even told of instances where their professional knowledge helped their personal lives, as they had people in their networks that needed AT and struggled to get it.

Expert knowledge also benefits users where low-cost AT and mainstream products can be utilised to support users, however, overall knowledge of these products was low. Therefore, users often found themselves on long waiting lists waiting for bespoke, and sometimes expensive AT products to be able to carry out daily function, more information is in Theme 2, "Device, Innovation & Maintenance".

And whilst peer knowledge-sharing among disabled people is helpful, a gap persists in their ability to gain information about AT. As mentioned, there is no central location or resource that keeps track of what products exist, how users rate them, or pathways to get them. This was highlighted by participants as especially dire with respect to access to AT funding and services.

> "it's very easy to say it's all about funding and I think that's a bit of a red herring really, cause I think awareness raising and training are to me the two biggest game changes for the future provision of assistive technology for people." [P13, Clinical Specialist OT]

Funding

As mentioned in Theme 2, funding the high cost of AT devices is a key concern for participants, despite the many pathways to getting government-funded AT. This is due to the fact that there is no clear instruction on how to choose which pathway is correct for a certain device in a certain environment, and how to navigate it. As will be mentioned in the next section **Theme 4: Provision Infrastructure**, the system is highly fragmented, causing users to lack awareness about what funding is available, via which pathway(s), and how to get it.

Stigma

Another challenge for uptake of AT products is stigma, either around AT revealing or emphasising their health condition or impairment, or with respect to the medicalised aesthetics of AT products. As one person explained, reflecting on their younger self:

> "I remember, as a young person, I absolutely wouldn't use certain things like [adapted] cutlery, because yeah, it just it makes you look really different." [P53, Senior Member of Staff, Disability Charity]

A teaching assistant at a specialised school for children with communication needs explained how stigma impacts students:

> "Yeah, [people] look at the [AAC] device [that an AT user has,] and ... it just flags up that that person's disabled. So no one wants to

speak to them. Or [in other cases] it'll flag up someone, and somebody will actually ask and come and speak to him about it. In some aspects, we are no further forward than we were 30-40 years ago because we can only really promote [acceptance of AAC use] during the school day. " [P8]

In line with this, some participants reported a preference for using mainstream technology in lieu of traditional AT, like iPads instead of a bespoke AAC device, because it's less stigmatised:

> "At the moment, the iPad seems to be [a popular AAC device that students use]. They seem to be an answer to a lot of things. I think for those students that don't want to stand out even more than they already do … it kind of looks a little bit more normal." [P7, Communication Lead]

It was also shared that if younger, or newer users of AT were able to hear from or speak to more experienced users, this could facilitate greater uptake and awareness:

> "But I think there's an area that does need to be improved and that is people using assistive technology having access to other people who use assistive technology to talk about it, you know. ... It just to be needs to be more open, doesn't it? People need to be more aware of it." [P7, Communication Lead]

Finally, several participants including a communication teaching assistant shared the sense of empowerment and satisfaction they felt when people break through stigma to allow AT to facilitate social inclusion:

> "I just think everybody needs the experience of speaking to somebody who talks in a different way and get that high from it, because there's nothing like it -- to know that you've chatted to a young person or a child who speaks differently to you. And it is just fabulous. Absolutely Fabulous. But for a lot of people, that's really scary." [P8, Communication Teaching Assistant].

Summary
Informed providers, developers, and suppliers as well as strong peer networks and media coverage leads to positive outcomes in AT Awareness and Uptake in England. Unfortunately, persistent barriers to this include difficulties keeping track of available products, complex funding systems, and social stigma around AT use.

Theme 4: Provision Infrastructure
Overview
England's current AT system infrastructure is characterised by extreme fragmentation, particularly across government provision pathways, which negatively impacts the country's capacity to fulfil needs. However, the system also contains successful specialist service centres, a third-sector ecosystem that helps to fill in

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government gaps, and documented practices of joined-up working and flexibility that could improve system efficiency and result in resource-savings if replicated.

Capacity to meet AT need

Specialist services

NHS Specialised Services concentrate passionate and expert personnel in "Hubs" where they work on specific types of AT, such as communication or environmental controls. These were designed to meet the needs of a small percentage of AT users who require the most complex assessments for such technologies and have been largely successful in meeting that goal. However, of note is the fact that these specialised services were never designed to meet the needs of all those with communication impairments and there has been underfunding of other, less specialised avenues to AT. Specialist services often have a strict criterion that many people won't meet:

> "There are thirteen of us in the UK, and we are only supposed to see these 10% most complex people. The other 90% of people who need communication aids are supposed to be funded through the [Integrated Care Boards] as they are now, or CCG's as they were. And unfortunately, they don't seem to know that or recognise it or provide any money at all." [P20, Clinical Lead]

An active third sector

England also has an active and involved third sector which seeks to help disabled people find information and funding about AT. This serves to fill gaps in government provision and drive awareness of both products and provision pathways. These organisations fund a rich array of equipment where they can, from adaptive cycles to AAC devices, and sometimes provide items for people to trial before they decide what they need.

Joined-up working & holistic care

We also found promising instances of joined-up working (Workforce & Training) and flexibility in provision that, if replicated, could lead to resource-saving and better outcomes in the government provision system. Where personnel can provide holistic care, looking across AT-type and at social as well as medical needs, this can lead to better experiences from both a provider and user perspective.

Flexibility in service provision

Additionally, flexibility in service provision is helpful in a variety of provision areas. Across regions with different demographic characteristics, providers reported that different models of working are necessary. For instance, in sparsely populated regions in the very north of England, working with contractors to get full coverage of the region may be necessary, whereas in dense cities, performing operations in-house may be more efficient. Likewise, within a particular service, flexibility in the referral and assessment process can be helpful to fit the needs of users and capacity of personnel. One AT professional explained the time and capacity savings gained by changing their referral processes:

> "I think we're the only ones that do a telephone referral service, just because we found that rather than getting somebody to fill in a massive referral form, they just ring us up and in half an hour we've got all the information … Our waiting list dropped from six weeks to accept a referral to a 30 minute phone call." [P21, Speech and Language Therapist]

Challenges to meet AT need

One of England's largest challenges in meeting AT need is the fragmentation of the provision system. Fragmentation occurs across sectors (health, social care, education, private, third-sector etc.), AT type (mobility, communication, etc.), geography (local authority and GP borders, regions), and across the life-span of the AT-user, resulting in inefficiency and high burden on the system itself and people trying to access AT.

Within and across these divisions, participants shared a lack of coordination and information-sharing see **Theme 5: Impact Data, Evidence & Accountability** as well as differing and contradictory regulations. This leads to time and financial inefficiencies, plus confusion and frustration among already-overstressed personnel and AT users, forcing them to go through repetitive assessments and other burdensome bureaucratic processes.

For instance, interviewees shared experiences of having to restart referral and assessment processes to re-justify their need for a product, for example a toilet commode chair - across different settings (such as work and home), upon moving to a new location, or as they age from child to adult services - despite no change in their condition or needs. Even for products which could feasibly move across divisions with the user, such as an AAC device being used at school and home, users were sometimes forced to seek out funding for duplicate products if, for instance, the education sector prohibited allowing the product to leave school premises. This lack of coordination and information-sharing about assessed needs leads to waste in time and funding, as well as higher burdens on providers, users, and the system as a whole.

Sectoral Fragmentation

We find that AT is provided via many pathways, across public sectors including health, social care, education, as well as the private and third sector. The complex bureaucratic ecosystem of government pathways, with multiple processes and complex criteria for each, is difficult to navigate for providers and users alike. Often resulting in inefficiencies of time and funding. Meanwhile, and likely because of how difficult accessing government provision is, many people acquire their AT through private purchase or third-sector charity funding.

Participants reported a lack of responsibility and ownership among public sectors, which often disagreed about who should fund a product:

> "I've tried for about two years to get a new shower chair, because mine is broken, and it was just constant arguments over which area was responsible. It's stressful. It's exhausting." (P25, AT User)

Others reported that despite agreeing on funding responsibilities, government sectors often could not decide which service should act first, resulting in protracted inaction.

> "Wheelchair services will tell you that you can't have a power wheelchair until you've got permanent ramping. And a community [Occupational Therapy] service will tell you that one, they need to means-test whether they will give [the ramp] to you or whether you need to pay for it yourself, and generally none of that happens within six months. It's a vicious circle of misery." [P2, Clinical Specialist OT and Team Lead]

Many raised the need for holistic, cross-sectoral coordination and provision within government actors to save time, financial resources, and the limited energy of personnel and users. As one participant put it:

> "Whose ultimate responsibility is it? Well, the simple answer is [that] it's everybody's. [For example,] communication is an issue that crosses health, education, employment, social care, etcetera." [P14, Senior Management]

As mentioned in 5.3.2 from the rATA survey data indicates that 60% of individuals obtain their AT products via self-funding or out-of-pocket expenses. These pathways to AT fill gaps in government provision, but also add to the fragmented nature of the field. Alternative funding of products often occurred because users did not meet the criteria for publicly funded devices, struggled to provide the required evidence that they did, had high assessment or provision wait times, or needed products that were not available via public funding.

> "It's not been as easy as I thought it would be for a lot of our young people because they don't meet the criteria -- so therefore you're back to relying on self-funding or charities ... [In order to meet the criteria for an AAC device] the students have to be able to use a paper-based system consistently in various areas of their lives ... But … some of these children are not interested in a paper-based system at all, so straight away they'd be excluded. But they like the technology. But they wouldn't get the access to the technology because they've not done the paper based." [P8, Communication Teaching Assistant]

An employee of a charity organisation noted that they help people fundraise for AT:

> "[In our fundraising schemes] we get a lot of people whose friends and family chip in. … It's not straight forward by any means. But … it really pains me that, for the sake of a few hundred pounds, somebody's sitting in a bed going mental [due to not being able to afford an assistive product to help them move around." [P24, Assistive Technology Manager]

Likewise, participants expressed frustrations with charity provision leading to an 'undermining' of the responsibility of local providers and having to 'fight' to get the AT they need.

> "Unfortunately, at the moment it's the [Motor Neuron Disease] Association who are providing [AT], which is absolutely bonkers -- because all that's doing is putting a sticking plaster on the wound and quite frankly, undermining [the fact that] that we need to tell these local services, these local [Integrated Care Boards], that they need to be funding [AT]." [P20, Clinical Lead]

> "I mean, I read the guidelines recently for the [Disabled Facilities Grant] and I noticed that they stipulate the person should have choice. But I feel like going privately is the only way to guarantee that choice. Because … you are often having to fight for that and sometimes that's more effort than it's worth." [P25, AT user]

Still, due to the impacts of COVID-19 and other economic difficulties, both individuals and charities are struggling to continue affording AT. One NHS clinical specialist OT who sometimes sends patients to charities reported that:

> "Charities have been in dire straits since COVID. Most charities that we would go to are shut for funds." [P2]

Fragmentation across AT Type

There is also fragmentation in provision across types of assistive technology, such as mobility, vision, hearing, communication and others, where each type has separate and differing processes, providers, support bodies and funding streams. While this may not affect those who use only one type of AT, many AT-users have complex conditions that necessitate two or more types of products, such as grab bars and hearing aids, or a wheelchair and AAC device. Both personnel and users reported frustrations with silos across AT-type, particularly because many products must work in tandem in order to serve the user properly. Issues were also reported regarding the inability of some providers to alter equipment from other providers, such as in adjusting how an AAC device attaches to a wheelchair, even when doing so was necessary to make both products usable.

When one member of staff at a specialist school where children had communication impairments was asked whether students (many of whom have multiple disabilities) frequently have issues with their other, non-communication assistive products, they responded:

> "You mean like chairs and class chairs or frames? … I don't think that's really knowledge to us, is it? ... I guess the one thing for us ... is the mounting of the [AAC] devices to either a class chair or a wheelchair or both ... There can be a breakdown in communication [between providers of different types of AT] … it's not thought about. … I mean everybody's -- we're all on our own programs, aren't we? Our bit is [making sure students have] the voice. And for us, the

voice is important. Therefore, it needs to be part of everything. We have got a couple of OT's now that are trying to work with us and bridge that gap." [P7]

Geographical Fragmentation

There is also significant fragmentation in the AT system across geography. While differences in population density and other conditions necessitate some flexibility in operations across geography, we found evidence of inequities in access across regions and a lack of information-sharing across local authorities. Many interviewees spoke to us about AT access as a "postcode lottery," where some people have far better access than others by virtue of the quality and capacity of services in their region. In the words of one provider in wheelchair services:

> "It really is frustrating … One guy lives down the road to that guy, … and one can have a wheelchair and one can't. And they might have exactly the same problem or condition, and the same mobility or lack of mobility. It just is very inconsistent." [P13, Clinical Specialist OT]

On another geographic level, AT users faced issues when relocating to a new local authority, whether near or far to their original home. Local authorities typically operate independently of one another and can be complicated for to navigate, creating high barriers to people moving, often to pursue work or be nearer to family that can support them. An AT user told us:

> "I have cerebral palsy, that isn't going to change when I move areas, but everything will have to be reassessed and it's just wasting their time and resources. And it's causing me so much stress." [P25]

The same person also suffers from cross-county jurisdiction issues in their new home:

> "Where I live now is a total nightmare because I'm on the border. I am literally on the border of two counties, and my social care and housing is funded by [one county] but my healthcare is funded by [another]. … And in terms of equipment and things, it causes a lot of arguments in terms of who can fund it." [P25]

Fragmentation across Lifespan

There is also a separation of service provision across an AT user's lifespan. For instance, a disabled child who receives most of their services through school and NHS child health and social care will, upon leaving school and turning 18, need to be completely reassessed and go through adult social care (as well as potentially a university or workplace) for their AT. The same is true during stages of adulthood, when users will have to be reassessed when moving universities, workplaces, or potentially when they reach an age where the NHS classifies them as "older adults." One UK-based independent consultant who has worked to shape AT provision systems globally commented that:

"This is a problem … The whole principle of the funding following the person, not the setting, still hasn't really been applied." [P11]

Summary

The country's provision infrastructure benefits where there is high specialist knowledge, an active third sector, and practices of joined-up working and flexibility. Unfortunately, these are often overshadowed by extreme fragmentation in government provision pathways which lead to frustrating bureaucracy and inefficiencies for users and providers alike.

Theme 5: Impact Data, Evidence & Accountability

Overview

This theme explores current practices around gathering impact data on AT use and reporting. Across the country, there is inconsistency in data collection and how data is being used to inform service design. In terms of capacity, we find that existing data is impactful and there are promising new attempts and willingness to collect data. However, challenges include missing data across important dimensions and continuing barriers to capturing data.

Capacity to meet AT need

Existing data shows impact

We find that although data collection is still limited, the data that *is* being collected indicates high positive AT impact. The standardisation and service specifications of the NHS England AAC services provides a good case study example of the need for AT data. Sector specifications lay out the need for providers to be collecting data through several defined means. One AAC provider shared how they implement this in their work:

> "We are trying to use the Therapy Outcome Measures tool, which is a standardised and validated tool which looks at activity and participations. What we try to do is we try to measure people, what they're able to do, before we see them or at the first assessment. And then [we measure] what impacts our equipment, and our input has had. So we do it [at the] beginning and end, and then we come up with a change number." [P20]

The evidence captured from the AAC specialist services was reported as being impactful and powerful in demonstrating the impact AT is having on the population they support:

> "We've got Therapy Outcome Measures that illustrate the impact of the services on their quality of life. So that's really powerful information and it shows, that all of the special services are doing a very good job for those people. So I think that's working well" [P14, AAC provider]

New Attempts & willingness to collect data

Also positive is the fact that there are new attempts to collect more data on AT, and a willingness among professionals to do so. For instance, AAC service providers

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described how they are now trying to feed data back into a wider system of learning and health inequity understanding:

> "A lot of the services are feeding into the Royal College of Speech and Language Therapists who … look at things like social deprivation areas where people are getting more input, or less input, or that that kind of thing, and different ethnic groups and what have you." [P20]

Because of their regional locations and expertise, AAC provider specialised services are particularly well placed to both try and develop new outcome measures as well as support local services in capturing data:

> "The other thing we're looking at quite a lot now is looking at developing some PROMs (Patient Reported Outcome Measures) and PREMs (Patient Reported Experience Measures) for our clients. So that's in the that's in the offing." [P20]

> "What we're trying to encourage our local teams to do is to build business cases. So we're saying 'if you if you work with us, what you need to do is you need to identify the need. So for every time you get a referral and you can't manage it, you need to be logging this and kind of saying how much time it might take you to see this person, etcetera.'" [P20]

Outside of specialised services, other localised services are collating feedback in the form of more routine service feedback mechanism:

> "Patient satisfaction surveys are sort of routine now. So within the trust we have a questionnaire that we encourage patients to feedback." [P3, Orthotist in NHS]

This is to varying degrees of success:

> "I don't think many people are actually filling out the feedback, so I don't actually really know." [P19, OT in Local Authority]

Data and progress is tracked in schools through anecdotal accounts about learning progress thanks to AT:

> "We capture [progress] It can quite often be anecdotally and just those written records of the progress the child's making. But it can also be reflected in the progress they're making towards their learning outcomes on their education, health and care plans. [P6, Headteacher]"

There was a sense of those more specialised areas trying to build capacity and support local services to capture information of the demand, as well as schools working to build evidence that could impact a child later down the line:

"What we can do and what we're trying to do is provide tools for local professionals to at least capture evidence of what the local need is because most places don't know that [P14, AAC service lead]"

"And so our passion, as well as to start this really young with our four and five year olds, start the work to produce the evidence so that hopefully by the time they leave us, there is funding in place to support these children as they go through secondary school and into adulthood." [P6, Headteacher]

In terms of accountability, data and set targets, either centralised or internal, supported some services to be accountable and responsive to the AT need:

"You know it's all out there. You can read. You can read these things. Yeah, it's all. It's all public documents. And I, we review, you know, we do reports to NHS England every whatever it is and the results of those are all. You know you can and anyone can read that, yeah." [P10, Clinical Technologist]

"When we receive a referral, depending on the scheme, but for example, we receive a referral from the City Council and our internal aim is to have like an initial contact with the with the client in five working" days, it's like only one week. Yeah, that is like our aim." [P18, Head of services]

Challenges to meet AT need
Missing data that demonstrates holistic AT value and economic costs

The impact AT is having, or not having, on individuals across the life course was felt by the participants to not be fully understood, captured, or utilised for change. It was felt there was missing data that calculated and evaluated the holistic impact of (in)access to AT across medical care, education, social care, employment and more. Failures to see this whole picture, created a missed opportunity in capturing possible economic savings further down the line:

"I don't think we do a very good job of demonstrating the value of that outside of our own little world. So, we don't demonstrate the value of reduced number of benefit claimants or increased number of people paying income tax because we've kept them in work or the reduced amount of care that somebody needs because they've got increased independence. I don't think we're very good at that." [P26, Manager]

"For me there's a worry that they are cutting back but not seeing the wider picture of actually providing a little bit for us now, could stop us claiming a lot more later, potentially." [P41, AT User]

"Is the model we've got giving the best value for money for impact? Impact is really important, but let's say for instance, if we change the

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model, maybe 69% of people through the model get into employment as opposed to 71%. But we've just saved 7 billion from the public purse." [P11, Independent AT Consultant]

Without this joined up data or measurement of impact there is a missed opportunity to fully understand and quantify how access to AT could support a person over their life course and save costs. An example of this is through the provision of telecare / pendant alarms. Where one participant spoke about the benefits they can bring when someone can call for help and the potential quantifiable impact of someone receiving help quickly:

> "what we're trying to do is minimise the impact on the citizen and then the impact on the system, because if we can get an ambulance to somebody quicker, and evidence states that every hour you lie on the floor is something like two or three days less in hospital for example. Then if you get someone there in half an hour rather than four hours, then your rehabilitation period is a lot less." [P4, Senior Management Team]

Barriers to capturing data

Barriers to understanding the wider picture of AT impact and collating data were felt to be in part due to a fragmented service design (see **Theme 4: Provision Infrastructure**), and funding systems that have different reporting mechanisms. This creates difficulties with sharing data and information across departments and organisations at local, regional and national levels:

> "if the DWP make a big, you know, several million pounds of cost saving because NHS has spent some money on communication aids, they don't know that and they don't benefit from, you know, there's those conversations don't happen" [P26, Manager]

> "So it might be a paediatric speech therapist working in special schools may be able to identify ten children on their caseload who could benefit from a communication aid who wouldn't yet meet NHS England eligibility criteria. But what they won't know is how many people in the ALD [Adults with Learning Disability] department and how many people in care homes in that region, how many you know, they won't, they won't know the bigger picture within their locality of local needs." [P14, Senior Management Team]

There was also a general absence of collected information which was cited as being perhaps part to the relative emergence of the AT field:

> "You need to measure what you're doing and prove that it's working. And so at the moment, people just do stuff that they've done before or that they think works. But without knowing what the evidence is underpinning it. So again, it's an immature field." [P9, Senior Lecturer in AT]

And the noted fragmented delivery, as described previously, led to reduced responsibility in knowing whose responsibility it was to collect data and report back:

> "I mean it's not necessarily my job and it's not necessarily the specialised services job." [P26, Manager]

Shared learning was echoed across multiple sectors, which individuals felt would be necessary to build up a more impactful business case for AT and to fully capture the demand at local level:

> "If you're a local Commissioner and you may not even be aware of this need or you might be aware of the odd person who's very assertive, demanding funding for a communication aid, but you won't know across your local area how many people need it. Cause that data's not systematically captured." [P14, Senior Management Team]

What was evident, is that even if data & evidence is in place, there needs to be strong leadership and accountability to want to change the system and invest in AT:

> "I think we can collate numbers, can't we? To actually put in front of people to show how this is, and building common sense, but I think there needs to be. Again it comes down to political will. And as I say, I think that this needs to be much more front and centre with much more investment attached to it." [P5, Policy Advisor]

Summary
Within Impact Data, Evidence & Accountability, we find that existing captured data on AT shows high positive impact where individuals can successfully access products, and there is a willingness among providers to make efforts to record more data. Still, barriers persist; most data about AT use remains inconsistent in its collection and siloed. There are significant gaps in data, with this critical evidence missing the impact of AT over the life course and in its cost saving effectiveness is not fully understood.

Theme 6: Budget Responsibilities & Priorities
Overview
In terms of budgets and prioritisation of AT, some of England's biggest strengths are the funding of NHS England Specialised Services for Augmentative and Alternative Communication (AAC) and Environmental Controls (EC). These were designed to act as "Hubs" in each region which serve those with the most complex needs. These Hubs were intended to be supported by local services acting as "spokes" and providing AAC to those that don't meet the regional specialist centres criteria.

Practices of budget flexibility were found to allow for better prioritisation and service provision. However, current challenges include the lack of budget prioritisation from local services meaning that the "spokes" aren't in place. This has created gaps in service provision and competing priorities at local commissioning levels.

Capacity to meet AT need

The country's NHS Specialist Service "Hubs" appear to be a success story in aiding provision and increasing available knowledge in their respective areas. Given their regional spread, unifying service specification and protected budget they act as equalisers to those with the most complex needs in cross-country provision. If a person meets their criteria, they will receive a multidisciplinary assessment and a subsequent product to support their communication impairment. An educational professional in a specialist school for children with communication impairments described their healthy working relationship with the local Hub, which helps them to serve students:

> "With the relationship we've got with the [Communication] Hub, we're probably quite lucky. I wouldn't like to say that's everybody's experience, but generally we're able to phone up and ask them to come and review things and they have and they've been, you know they've listened to what we've said ... But that's trust we built up isn't there?" [P7]

Additionally, an NHS provider of communication aids noted that the communication hubs have helped create a more stable provision environment:

> "When I started, [the communication hubs] didn't exist and … It all took longer because we didn't know if we would get funding. … You just never knew whether they were gonna say yes or not. And then if they said no, sometimes we could provide more evidence and then maybe get them to say yes. So … you couldn't maintain a stock that you could be sure you would ever get back." [P10, NHS Clinical Technologist]

One member of such a Hub, however, mentioned the need for local staff to ensure their efforts come to fruition:

> "I think the hubs have got a really good role to play in, in teaching, advising, supporting local teams -- but we need the local teams to be there." [P20, Clinical Lead]

Prioritisation & Flexibility

It was noted that having flexibility over how your budget is spent helps to facilitate informed and expert local leaders to provide the AT that is needed, in a timely and empowering way. This was echoed not only within NHS Specialised Services but in local authorities and schools:

> "And when [employee name] will come and say oh there's a new device out that does XY&Z and this one doesn't, and I'll have a look at all my budget and I go right. Get one, you know, because it feels right." [P6, Headteacher]

NHS Specialist Services have had a change in their criteria and what they deliver, meaning that now if someone is eligible for their specialist assessment, they can

provide any range of AT from their budget. This improved power and flexibility over spending has enabled providers to make decisions on purchasing a device via mainstream routes (amazon) as well as specialist channels:

> "we go anything from a ten grand install down to a £40 stylus…It's a big range of what we can provide." [P13, Clinical Specialist OT]

> "we can buy off the shelf or we can or we can buy we can sort of you know like when I say off the shelf I can go to Amazon if I need an iPad case for example, don't have to you know, but and then they're obviously the more specialist suppliers for the special kit as it were the expensive stuff" [P20, Clinical Lead]

The importance of being able to manage budgets and costs of AT had been built into competency frameworks by some teams. Clinicians working in AT not only need to be experts in products and assessment, but also in knowing how much items cost and how to balance budgets. Further highlighting the interdisciplinary nature of an AT professional:

> "You know, my manager would expect me to understand, and part of my competencies is to understand the price of all the equipment and what it all does and what the alternatives are and what price those are." [P13, Clinical Specialist OT]

Challenges to meet AT need
Changes to budgets
Participants across the range of stakeholder experience iterated the recurring need for more funded support bodies that can aid users, providers, and others in accessing, using, maintaining and recommending AT.

Some AT users noted that available support has declined over many years, recalling publicly funded support bodies which existed in 2010-12 were now no longer available. These bodies provided a wealth of expertise and services, with one participant who has worked in the field for two and a half decades recalling:

> "Things have got radically worse … because the support bodies have been cut ... So what the support bodies did was ... when I didn't know how to do something, I could phone them up, ask them to come and see me, bring a piece of equipment, show how something worked, recommend another organisation that had already done the thing I was trying to do that I could go and visit and see how that worked. So they share the best practice that was already happening in the sector. They helped with procurement, you know, "where's the best place to buy from?" They evaluated projects that people were running. They provided seed funding for getting things off the ground for proving an idea. ... All of that was lost when all of those organisations closed. ...And so there is no national support body for AT and education, health, social care or beyond. There's nothing. There are small regional groups only now… quite a

lot of those have shut down around the rest of the country." [P9, Senior Lecturer in AT]

AT providers also told us about the shift to sub-contracting within services, which has been as a budget saving initiative but has been fraught with some challenges elsewhere:

> "It was subcontracted out as a means of controlling the budget as much as anything else…So what effect does that have? Uh, yeah. So, that's extended our logistics a little bit, its stretched out that logistical train. So when we order devices, they have to go through a couple of extra stages and that kind of works okay, but we're limited as to what we can order." [P3, Prosthetist and Orthotist]

Inflexibility

Conversely to the noted positive impact of having flexibility on budget, there were challenges with inflexibility which were felt in part due to historic systems and how they were first set-up. As described by one OT working in wheelchair services:

> "So a lot of it is historical about when your service started and what budget you were provided with and therefore what it allowed you to do, and then it often stands in time." [P13]

This inflexibility across spending and device selection in services was a noted contrast to the specialised services as the same OT goes on to explain:

> "[In AAC] we've very much got the remit that we can go and investigate and find if there's something out there that meets a very specific need. We're not limited to a set number of things. So it's a bit different than in the wheelchair servers where you've got set wheelchairs, you're allowed to choose from." [P13]

Competing Priorities

Many of the participants we interviewed did not have expectations for "an endless pot of money" but it was felt that time and time again priority was not placed on community service support. This was noted to be due to lack of compelling data, as described in the **Theme 5: Impact Data, Evidence & Accountability**. Funding was felt to be channelled, elsewhere, towards acute and emergency services.

The competing priorities of provision were also felt across the different conditions and diagnoses, where clinicians will make decisions based on who they see and when based on a person's level of degeneration:

> "in the service spec it says around priority based on degeneration. I think there's been a kind of skew, like V1 kind of alluded to for MND. By almost the perception being that MND is the only thing that pulls into that category of having a degenerative condition" [P29]

As another OT described some of the issues around wheelchair provision and funding priorities which were down to local commissioning and GP-led decisions:

"I think for wheelchair services it's your local CCGs which I think is why it's very different because obviously your local CCG, your bunch of, GP's across your borough have got differing priorities of where they want to spend their money and what value they think it is, and I think that's what is influencing and therefore the different budgets people get and then therefore the different criteria they have to make out of those budgets." [P13]

The challenge with competing funding priorities was further discussed below, even once data is captured – what next? There isn't the available information yet to inform commissioners and how much they would need to set aside to meet any population needs around AT, which was felt to be limiting:

"And even if [data] was captured, you still don't know. Well, what's the solution to meet the needs? You know, what does good look like around the local AAC service? You know, how much does it cost? I'm gonna have to find a budget for it. How much does it cost to create a local AAC service and an equipment budget for this local need?" [P14, Senior Management Team]

Summary

England displays promising practices in AT capacity in its funding of specialised service centres in AAC and EC Hubs designed to serve users with complex needs in their local areas. Additionally, flexible budget practices allow for smart prioritisation and more efficient service provision. However, challenges include declining budgets in recent years, system inflexibility, and competing priorities of AT with other government budgets and within AT across diagnoses and services.

5.3.4 Scope data – unmet need for AT

We present a review of findings from the data provided by Scope, which sought to understand the populations' (unmet) need for AT.

Disabled people who participated in Scope's project described their AT as their lifeline, but also the most common challenge they faced was understanding what they needed and how to get this. For many people, the question was, where do I start? Other questions included if users need to know what AT they need themselves or have an assessment to identify what they need, where the request AT need to come from, do they need to be able to afford the AT themselves or can they apply for funding before working out what they need.

When disabled people are trying to access AT through health or social care services, there is often a long waiting time. People report that the process can be "exasperating", leading to people trying to buy AT themselves and finding out that it does not meet their needs. There is also an emotional and psychological impact that comes with long waiting times. Many parents of disabled children report that waiting times can harm their wellbeing, as well as the wellbeing of their child, because there is no advancement in their development. This can include social as well as developmental milestones and educational development.

One of the major problems disabled people face with AT is the cost. Many users will forage to find funding or grants available to buy AT because they cannot afford it. For some people who may have been able to save money to buy AT, there is often nervousness about buying it in case it does not work for them or in case their needs change in the future, and it is no longer suitable. AT is seen as a major expense and often requires disabled people to sacrifice their spending in other areas of their life.

5.3.5 KII and FGD Results – met and unmet need

The participants from KII and FGD reported they access their AT device and funding in a variety of means across NHS teams, Local Authority, NHS Specialised Services, Charities, Access to Work, Disabled Students Allowance, Disabled Facilities Grant, Education and/or Private Purchases.

These findings align with the survey results that present a mixed picture of service access. The descriptive experience from participants explores not only how a person may access AT but the quality, challenges and timeframe of the service delivery and access, which can largely depend on where you live, the AT you need, and the local service awareness of need, budget, and criteria. These themes have been explored in greater depth in 4.3 in answer to RQ 2.

Three case study examples have been constructed to support the narrative and understanding of how people access AT in England. These examples present some of the current challenges and timeframes of provision models. They have been developed and collated from the KII and FGD. They are not based on an individually identifiable person but instead represent 'typical' people trying to access AT.

Case study: Maggie

Maggie, an 81-year-old woman, is finding it difficult to move around her house and look after herself and has been referred to a community OT by the local GP.

Meet Maggie

Fiercely independent – wants to live at home without care for as long as possible.

Knee pain – she has difficulty standing up from her chair and toilet and can't stand in the shower anymore.

Eyesight and hearing – are not as good as they once were. Her glasses and hearing aids are a lifeline. She can, with them, read important letters and stay connected with friends and family.

Mainstream technology – she enjoys her Amazon "Alexa" (bought with savings and help from her daughter). Maggie often finds herself asking questions to Alexa when she can't remember bits of information like the day of the week or when the next bus is.

OT referral

Assesses and **provides next-day delivery** of a shower chair and grab rails.

Assesses the need for a pendant alarm/telecare system but **must refer to the Assistive Technology team** for the provision.

Assesses the need for a walking frame but **must refer to the health team** (physiotherapist) for provision.

Result

Maggie grows frustrated and confused with the number of new people and processes she must deal with.

Maggie doesn't understand why the OT can't provide all the AT she needs.

Maggie must also keep up with the team who gave her a hearing aid and yearly appointments at Specsavers to check her degenerating vision.

Maggie is grateful for the help she eventually gets but just wishes it wasn't so confusing and that her care teams would talk to each other.

Case study: Dinesh

Dinesh has been receiving rehabilitation in a specialist centre for a newly acquired spinal cord injury. His rehabilitation has involved intensive physiotherapy and OT. Dinesh has learnt new strategies and skills to accommodate his new disability. It has been a long and difficult process for Dinesh, but he is looking forward to returning home.

Rehabilitation

Dinesh learnt to drive an electric wheelchair.

The clinical team set up the wheelchair and postural support to maximise independence and reduce the risk of skin damage.

Dinesh finds sitting up and moving around, rather than lying in bed, greatly benefits his mental health.

Referrals for Discharge – Wheelchair services

The OT in the hospital sent a referral to the wheelchair services local to Dinesh's home address several weeks ago to order Dinesh his wheelchair. Since the referral was sent, the hospital team have been continuously chasing it up to find out if it was accepted and waiting times. The team often can't get hold of anyone to speak to.

Dinesh is incredibly apprehensive. Since his injury, Dinesh has found Posts in an online forum have told him there have been huge delays in getting wheelchairs recently. It seems that this is largely dependent on where you live. Some people report waiting just a few weeks, whereas others are waiting nearly 2 years.

Referrals for discharge – home improvements

The local OT who reviewed his home won't start the home adaptation work until she knows a wheelchair is guaranteed.

Result

Dinesh might be discharged home in a bed and doesn't know if he can face the next year of his life like this.

He wonders why the team in the hospital ever bothered with his rehab and letting him try a power chair if now having one for home isn't possible anytime soon.

He wants to have the opportunity to get on with his life, to re-find his purpose, work, and independence.

Dinesh has worked hard during his rehabilitation to be where he is and now feels the system is preventing him from living his life.

Case Study: Alex

Alex has been experiencing some recent and rapid changes to their speech and mobility and has been newly diagnosed in a consultant clinic as having a degenerative neurological condition.

OT referrals

The occupational Therapist (OT) present at the diagnosis consultation **initiates referrals** to services. The OT notices Alex's GP address and home addresses are on the border of two local areas. They know this will make access to support more challenging. The OT refers to the following services:

- to NHS Specialist Services for support with communication.

- to **wheelchair** services for an assessment.

- to a local community **physiotherapy** team for a mobility aid.

- to **district nursing** for continence and pressure area care.

Specialist Services (SS Team) (communication)

Use **nationally standardised criteria** to decide Alex doesn't currently qualify for their services. (Alex still has some function in one hand – they can use a standard touchscreen device)

The SS Team inform the OT **to re-refer when Alex's function has declined** to a point where they cannot use either hand. Then the team will prioritise the referral.

The SS Team advise the OT to work with Alex to **access functions on a standard mainstream device** (e.g., tablet/smartphone) and to refer them to a local NHS speech and language therapist (SLT).

Unfortunately, there **are currently vacancies for SLT and no one available to support them**. Alex and their family do not have the funds to access a touchscreen device, so they turn to a **national charity for advice.**

Referral – Local Wheelchair Services

The local wheelchair services receive the referral and currently have a waiting time of 6 months for an assessment.

However, they see Alex has a declining neurological condition and prioritise them for an assessment in 3 weeks.

Alex would love to have an electric power wheelchair to independently enjoy the garden and go to the park with the children as they are struggling with walking even a few metres.

However, Alex could take a few steps inside with the support of their family on that day – therefore, they **do not qualify for a power wheelchair.** They are instead offered a manual chair, meaning they can only go out and about with family members who can push.

Receive referral which has been sent for a mobility assessment and walking aid provision. They currently have a <u>waiting list of 9 months,</u> but on triaging can see Alex's condition is deteriorating, so they prioritise for a visit in 2 weeks.

The physiotherapist is **not a neurology specialist**, but **these services are unavailable** in Alex's local area. The physiotherapist calls the neighbouring service for advice and receives tips, but they cannot visit Alex as they are not in their catchment area.

The non-specialist physiotherapist visits Alex at home and **prescribes a pair of elbow crutches** and a commode for delivery the next day.

The physiotherapist thinks Alex could benefit from some grab rails around the home and possibly a shower chair. They refer (**new referral)** Alex to the local independent living team in the council for an OT assessment.

Review – Consultant Team

Six months later, Alex is reviewed in the consultant clinic. Their mood and functioning have deteriorated. The OT is also present again and realises that now, as the person can no longer walk at all or use either hand, they are now eligible for additional support services. **They are re-referred to the previous support services.**

Summary

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         ┌─────────────────────────────────────┐
         │   Diagnosis –  Consultant Team      │
         └─────────────────────────────────────┘
                          │
                          ▼
         ┌─────────────────────────────────────┐
         │  OT Referral – 5 different services │
         │  Thresholds for AT are often not met│
         └─────────────────────────────────────┘
   ┌───────────────┐      │
   │  Six  Months  │      │
   └───────────────┘      ▼
         ┌─────────────────────────────────────┐
         │     Review –  Consultant Team       │
         └─────────────────────────────────────┘
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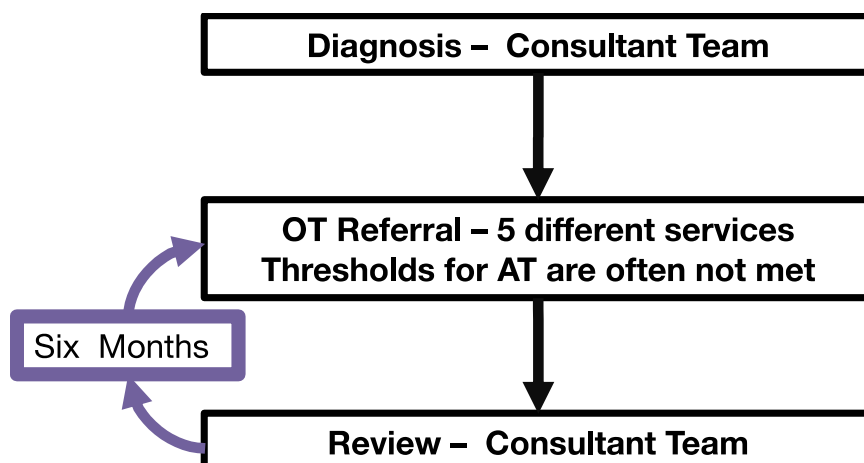
Summary

As we can see from these multiple representations of people's experiences, there are numerous barriers which can negatively impact individuals whilst trying to meet their need for AT. There are fragmented services that currently try to meet the needs for AT provision and support. There is a lot of confusion and assumed knowledge that users themselves do not have in how to navigate these multiple services. Often, service providers are also unable to circumvent the existing guidelines to provide

access to the services they know the people they work with need. The multiple stakeholders involved in the system have increased levels of dependency but tend to have low agency in trying to fulfil the unmet need. Many people are left waiting for a long time to gain access to the appropriate AT that can have far-reaching benefits for a person's health and well-being.

5.4 Impact of assistive and accessible technology on people

Impact can be measured in multiple ways and can mean different things to different people. We report the findings from the ATA-I derived questions from the survey and the analysis of the Key Informant Interviews and Focus Group Discussions to explore the impact of assistive and accessible technology on AT users themselves.

5.4.1 ATA-I Findings from the survey

As participants were focused on their APs during the survey, GDI researchers added a final question on product impact. Participants were asked to rate the importance of their APs to their daily, weekly, and monthly activities, from very unimportant (option 1) to very important (option 5), or unsure (option 6). Figure 5 illustrates the responses from our participants and demonstrates that 83% find their products to be important, or very important, to daily, weekly, and monthly activities.
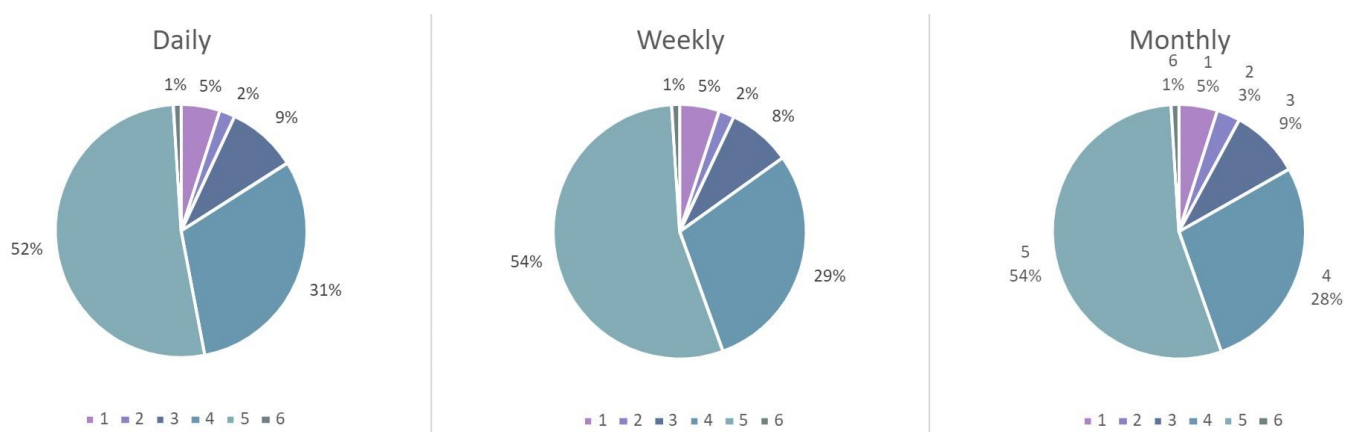
Figure 5: Importance of APs

Of all participants, 71% (n=5122) who reported they had at least one AP said that it mostly or completely helped them to do what they want. However, understanding the individual impact of these devices requires a highly individualised approach.

5.4.2 ATA-I Findings from KII and FGD

The impact of AT on those who use it was overwhelmingly positive, with users sharing a myriad ways their APs afford them freedom, independence, and quality of life. However, those lacking access to AT report a commensurate negative impact on their lives. Many who successfully received APs reported that having to "fight" through the government provision system caused distress and health problems. AT

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provision has a high return on social investment, with economic benefits for users, the state, and society.

Positive Impact of AT

The quantitative findings were supported by feedback from interview and focus group participants, who shared a diverse array of positive impacts AT has on users' lives. Overall, access to AT serves can increase users' social inclusion, ability to perform Activities of Daily Living (ADLs), and results in higher economic productivity and system cost-savings.

Social Inclusion

Participants stressed that access to AT cultivates social inclusion, enabling them to engage with and be part of their communities more fully. Below, a graphic at Figure 6, lists just a portion of the diverse array of activities that users were able to achieve because of AT. These range from accessing the outdoors and expressing their personality to spending time with family to asking someone to dance:

> "[outdoor wheelchair] I am quite an extreme user; I can go up mountains in it; I really like it. I like it as well because there are lots of colour options, and being able to personalise it to me, and reflect my personality." [P25, AT user]

> "We've got a couple of children in school with funded devices at the moment, one on the autistic spectrum and one with cerebral palsy. And they take them home and the difference they have made to the children's lives and the family's lives is just ... it's not measurable, really." [P6, Headteacher]

> "He was laughing away on what he was saying on his device to the other little girl and it ended up with him having a dance. He said, "would you like to dance?" and, you know, she needed support to do it, he's nearly doing that independently and they start to put some music on and we're dancing and he just loved it." [P6, Headteacher]

> "She can ask for what she wants, and everybody embraces that." [P6, Headteacher]

Figure 6: Graphic of quotes from Participants where they tell us what AT enables them to do.

Activities of Daily Living (ADLs)

The term Activities of Daily Living refers to "all the essential, basic self-care tasks that people need to do every day to keep themselves safe, healthy, clean and feeling good. From getting up in the morning, showering, grooming, preparing and cooking meals, shopping and travelling to maintaining the house, garden and taking care of pets" (NHS). Many types of AT enable disabled people to manage their ADLs independently, more efficiently, or with less one-on-one personal assistance than before. While some people will always need personal assistance, given high support budget costs and workforce shortages, higher AT adoption could lead to cost savings in social and health care.

In the graphic below (Figure 7) are some of the ADLs that participants highlighted as possible due to the use of AT. They include studying, working, turning on the lights, opening the front door, driving, and more. AT users in our interviews and focus groups shared the ways in which their APs allow them to perform ADLs:

> "I'm an electric wheelchair user. Well, I have two different kinds of electric wheelchairs. I have a day one and an offroad one. They are my lifeline, really--without them I couldn't do anything, I couldn't go out the house." [P25]

> "I felt equal, and I could drive myself to places." [P42]

"So, I have [an Amazon] Alexa which I'm finding quite useful, and I actually put that on my personal health budget because I think that is, it's a way of accessing the phone with your voice. Because I can't, unless my PA puts my mobile phone in my hands, … I can't access a phone. The only trouble with Alexa is it won't phone the emergency services, I think. So that could be an improvement." [P42]

Figure 7: Graphic of activity list from Participants where they tell us what AT enables them to do

Economic benefits to individuals, the state, and society

Access to AT also has a high social return on investment. Participants reported AT users being able to work at higher productivity levels or begin working altogether thanks to their AT. As one expert and researcher in assistive technology shared:

"At the complex [disability] end, if someone's more independent, then the lifetime package of care that that person needs is going to cost less … They can work, they can get a technical job perhaps. … That's going to have an economic impact.

At the other end of the spectrum, you've got people who are going to be able to attain at a higher level. So, you've got someone who's got, say, significant dyslexia. If they get the right intervention at a young age, then they're going to have better outcomes … They're

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gonna be a taxpayer at a higher rate. They're gonna get a better job…

So, the social return on investment of doing assistive technology right is awesome. **… How can we afford not to do this**?" [P9, Senior Lecturer in Assistive Technology]

Likewise, AT enables people to be active consumers, getting out of the house to spend money in shops, restaurants, and more.

Access to proper AT also reduces avoidable medical issues and higher support costs by keeping people functional and safe. This can reduce hospitalisations and other pressures on the healthcare system, leading to down the line savings. As one AT user shared:

"[Without my wheelchair,] the only other option would be for me to be in bed, because I'm not able to sit comfortably in any other chair for more than about an hour or so. … [If I was stuck in bed,] my health would deteriorate unnecessarily, and my mobility would deteriorate." [P42]

Negative Impacts of Struggling or Failing to Access AT

Participants expressed strong negative consequences when they lacked proper AT or faced high barriers to getting it. A continuing frustration from providers and users alike was the difficulty in working within the complex, highly bureaucratic, and overburdened government provision system. Many represented the system as a barrier itself, something to "fight" to get what one needs. One AT user told us:

"Don't get me wrong, Assistive Technology has changed my life. I wouldn't be who I am without it. I wouldn't even be at university or living on my own. So, it's good -- I just wish this system was easier. … To be honest, I think every interaction I have [with AT services], I prepare myself for a fight. I am surprised when things go smoothly. I've probably had more bad than good." [P25]

Similarly, a clinical specialist recounted the case of a patient who was unable to access AT due to system failings, and whose health deteriorated severely without it:

"[We had] a patient in clinic this week; his wheelchair provision had not been ideal. Let's say it hadn't been reviewed. He'd tried to access a review. It hadn't happened [yet]. He'd had changes in his body morphology over that [waiting] time. And so, by the time I saw [him] ... it's more difficult for him to do his wheelchair transfers, more difficult for him to get to the car. It meant he had to give up work. And if we want to bring that down to kind of a more medical model, it meant that he had increasing pain; he developed scoliosis, he had new neck pain, and we would then have to do remedial works trying to fix some of that. Whereas if he'd had the correct provisions in the

first place, we wouldn't have these [issues]." [P22, Consultant in Rehabilitation Medicine]

The same specialist also expressed frustration with the fact that patients often couldn't qualify for AT at home that they had been assessed for and used while inpatient:

> "Patients even ask us, why did you set me up with a power chair while I've been here? If you knew I can't have one on discharge."
> [P22]

Likewise, an OT told how even after having their lives saved by acute care after a spinal cord injury, their patients had little to no quality of life without proper AT:

> "If we're going to save people with all this fantastic care that we've put into the major trauma centres, and we're going to make them live with these injuries, then we have to have the gumption to put it in at the back end, so that you allow them to live." [P2]

Summary

AT clearly has a high, positive affect on those who are able to access it, with 83% of disabled people surveyed reporting their products to be important or very important, to daily, weekly and monthly activities. Participants in KII and FGD likewise reported a wide array of social inclusion, daily living, and economic activities that they are only able to do with the help of APs, from reading the Quran to opening the front door to working. We find that AT likely has a very high economic and social return on investment given its down-the-line gains.

6 Discussion

The discussion of the findings is presented below by the 5Ps of the WHO AT model as an organising principle for the data in line with the methodology.

6.1 People

The nationally representative survey (rATA) of disabled people found that 87% of those surveyed needed at least one AP. However, 31% of the disabled people needing AP did not have access.

From the short survey of the general population, we found 65% of the general population needed an AP. As this was done for international comparison only and no further evidence discussed emanates from the general population.

The unmet need among disabled people is **significantly higher in London (43% in London versus 31% Nationally)**. Differences in gender, race and class are less pronounced than may have been expected.

Unmet need is also higher for young people (2-17 years old). It not possible to discern from the data exactly why the need is so much greater for younger people (28% higher than the 65+ age group); it might be the case that younger people are more aware of their need for AT – only 2% (6 people) cite 'do not know about APs' as a reason for their unmet need within the younger age group. This would mean that older people may underreport their needs due to a lack of awareness. Such underreporting has been noted previously for self-report population-based surveys for APs (e.g. (51,52)).

When APs are provided, users reported to be generally or highly satisfied with them; though this should potentially be caveated with the fact people are likely to appreciate what they have (potentially true also, if they have had difficulty in getting the AT). Unequivocally, the impact of AT on a person's quality of life is very pronounced – **83% of disabled people said their AT was very/important at all times**.

Despite most AT being, at least, in policy terms, free at the point of access to users in England, in reality the survey showed that in accessing AT, most people had out-of-pocket costs. High costs are evidenced as preventing access to AT for almost half, 45% stated that 'cannot afford' as the reason they do not have AT. This is higher for those on lower incomes.

Taken together, this evidence suggests that **almost a third of people who need AT do not have it,** and therefore cannot participate in society since it is so impactful in enabling this for those that need it. A full economic impact assessment of this would be very helpful to inform policy making.

From the qualitative findings, participants explained **how routes to attain AT were often complex, time consuming, fragmented and frustrating.** AT users needed to become experts in knowing how to navigate the system, who to ask for what, and how to find out about funding options. There was reported limited publicly available

and centralised information on AT, with users often relying on and seeking expert advice from each other.

Across the data there was an echoed sense of **resource wastefulness with repeat assessments common**. AT users reporting the need for re-assessments of their AT needs from the public or private sector. Sometimes this happened when users moved locations; or moved between funding streams (e.g., from DSA to Access to Work); or when their AT was in dispute as either a "health", "social" or "educational" need. AT users were astutely aware of their not being "an endless pot of money" but they believed that **if their expertise was valued and they had more control, information, and choice over their AT options this would improve their AT uptake, experience, and outcomes** – all while reducing demand on services. A participant who had extensive policy experience both nationally and internationally felt that personnel could be utilised in a system of escalation, when finding or accessing AT independently wasn't possible (e.g. in more complex needs).

6.2 Policy

The UK Equality Act 2010 makes it unlawful to discriminate against a person based on disability and the Equality Duty is an accompanying statutory instrument which places a responsibility on public bodies and those delivering public functions to meet the needs of all individuals through policy, employment, and service delivery. The Duty encourages a proactive approach to disability inclusion. It enables parties to recognise their responsibility in promoting equality and removing barriers to benefit their organisation and the wider community (53). Further, in February 2023, the Department of Health and Social Care published its first-ever medical technology strategy (44). While not all assistive technology is considered medical technology, assistive technology including digital health and software and prostheses are categorised as medical technology. The strategy outlines how the department:

> "Will ensure the health and social care system can reliably access safe, effective, and innovative medical technologies that support the continued delivery of high-quality care, outstanding patient safety and excellent patient outcomes in a way that makes best use of taxpayer money" (ibid, p5).

Taken together these policy instruments make a strong case for action to address the 31% gap in AT provision to disabled people in England.

The UK is a global leader in Educational Technology as HMG recognised in its International Trade Education Strategy (2019), which sought to boost exports in EdTech so other countries could benefit from the UK world-leading expertise (54). This ambition aligns well with the need to develop a well-functioning service (and therefore market) for EdTech abroad, as well as at home - as set out in the Department for Education's EdTech Strategy (2019). This Strategy made several commitments to assistive technology and inclusive practices in the classroom (54). However, despite commitments, the **All-Party Parliamentary Group for Assistive Technology (APPG AT) found several limiting factors to the provision and use of AT in the classrooms, including a lack of awareness, a lack of centralised**

procurement and lags between classroom activity planning, the realisation of the need for AT and provision (54). This points to the need for centralised or regional provision models to help overcome market fragmentation. Teachers were also found to lack the time, resources and training required to meet the AT needs of their disabled students (54).

Findings from this research correlate to the policy issues cited above. Participants from our qualitative research identified the need for **more centralised practices to reduce regional inequity of AT access**. **It was felt that more collaborative and joined up thinking was required** that spanned education, health and social care to facilitate access and reduce economic and resource waste. Policies were urged that prioritised AT provision, encouraged data collection and accountability, and that captured evidence of the full and lifelong impact of AT on both an individual and societal level. Workforce development and AT awareness is a priority identified by participants. The current lack of expert personnel and absence of professional accreditations is impacting the country's capacity to meet AT demand. The need to upskill frontline professionals to promote awareness and AT uptake has been a focus area of a new report from collaborations across Policy Connect and partners (55).

6.3 Products

Products with higher use, typically were also included within the highest unmet need category.

By domain, the highest unmet need was for mobility APs; the number with unmet need often exceeded the number of users. For pressure relief cushions and mattresses, manual active-user wheelchairs, electric wheelchairs, and manual push-type wheelchairs, manual postural wheelchairs, club foot braces, spinal orthoses, and standing frames, had the highest rates of unmet need compared to their rates of use. The most frequently used APs (glasses, incontinence products, pill organisers) most often had out-of-pocket cost associated with them, and cost was the most commonly cited barrier with regard to access of all APs.

From the qualitative results, robust repair and update systems were seen as essential as accessing the device in the first place. If AT users were able to access funding for the initial device, there were exposed risks and difficulties of where to go, and who could fund it when things went wrong. Digital updates can be fraught with difficulty and can render AT unusable, there is a need for any digital developer to understand the implications of updates on AT users, working in collaboration with the end user. There were additional challenges if devices needed to be sent out of the UK for repair, leading to extended times waiting for the product to be returned.

Good examples of repair, technical support and reuse systems were reported, which were often within the more specialised services who had the expertise, regional oversight and technical inhouse capacity to deal with issues. This recycling of devices was leading to a reported economic saving by regional centres who felt there was great opportunity in improving the national management of products, as reported by one regional manager: "We can break it down as a different

types of equipment, but we're estimating overall we're realising cost efficiency savings in the region of between 30 and 40% of the of the total cost of the device, which is quite significant".

Mainstreaming of AT functions like speech-to-text offers the potential for more affordable and usable AT. However, it is challenging for AT users and providers to remain up-to-date on these advances or to provide mainstream technology within the current systems.

6.4 Provision

AT is not a single product or service and hence the lack of joined up pathways to provision has been identified as problematic in the data analysed. The sector can be considered a sector or sectors (56). Within these sectors, APs are provided. Some must be provided through specialised services (e.g., prosthetics and communication devices), whilst others can be purchased without mediated access (e.g., incontinence pads). Much of provision cuts across different medical and even educational specialisms and will only be usable in inclusive environments (digital and physical). **Therefore, developing an integrated provision policy within Government and across multiple departments is challenging**. In such instances, when each piece of the puzzle can seem small relative to other areas within a portfolio, it might not be tracked well, if at all.

We have seen a **lack of procurement data from government** departments; they either don't track or struggle to find data on AT. In limited interactions with the departments, it appears this is not from a lack of want to collect and track such data but a lack of resources and structure.

What does this mean? **Without such data, it is impossible to fully assess England's capacity to provide AT or to model any possible cost efficiencies**. As recommended by the WHO in their manual for conducting an ATA-C (2), having no data is a data point in itself. The fact that we can't measure what England is buying makes it much harder to measure the progress of policy or practice. It also makes it harder for Government to optimise the provisioning strategy.

Despite the lack of centralised procurement tracking, it is clear that AT is being provided through multiple parts of the National Health Service, Local Authorities, and other government services (e.g., education). **Service delivery has proliferated across the system(s), but no one has a clear picture of who can provide what to whom, when, and in what circumstances.** This in turn is disincentivising personnel, who cannot track progress but who on the front line experience the frustration of not being able to provide products they know could benefit a person. Finally, the complexity of provision systems leads to trust being eroded with both personnel and the public (people). This is captured well by [P25, AT User] "To be honest, I think every interaction I have I prepare myself for a fight and I am surprised when things go smoothly. I've probably had more bad than good."

6.5 Personnel

Personnel are integral to AT provision. Across all sectors (education, health, social, charity, and more), they help create awareness and access, advocate for people's needs, and support the provision of devices with training and expertise. Yet, they are struggling under the weight of demand. Teams are missing capacity and finding vacant posts exceptionally difficult to fill across all sectors. These findings support those found in the literature review of the documented shortages of every healthcare profession cited by the UK Parliament (46). Within the health and social care sector in particular, waiting times are increasing, with staff still struggling to recover post-COVID-19 pandemic when resources were pulled from AT services to acute care. The impact of this is captured by one OT saying [P13] "[wheelchair services] have got horrendous backlogs. They were talking to me about how long it is and how they feel like they spend half the days dealing with complaints because people are fed up just waiting for a wheelchair to go out in."

With their dedicated expert and passionate teams, NHS Specialist Services for AAC and EC have helped to accelerate and enhance access for people with "the top 10% most complex needs", as one provider explained. **They were designed and funded to be the "hubs", with local communication services acting as "spokes". Yet findings from the KII and FGD tell us these "spokes" are missing.** The hubs are working to capacity build and support local services to capture data and build business cases to take to their local commissioners, but with staff shortages and competing priorities there is no evidence to say AT is prioritised locally - leading to huge gaps in provision. Much of the population are falling through the cracks and missing out on any AT opportunity. Furthermore, the NHS Specialist Services are AAC and EC-specific and have set specifications and eligibility (57,58), other AT domains, like wheelchair provision have no such "hubs" that can act as regional expert centres leading to further fragmentation and regional variation in supply.

For the personnel outside of Specialised Services there are competing priorities and long waiting lists. They are strained and under-resourced which leads to difficulty in capturing data on AT need and impact to feedback into the system. **Unless it is prioritised by a passionate and dedicated leader, personnel have challenges in keeping on top of their own learning and training of the latest innovations, devices and funding streams.** There are examples of collaborative working and interdisciplinary competency frameworks within some teams, however again these are variable and there was no evidence of a nationalised CPD accreditation or centralised resource for all AT domains that the workforce could learn from. Limited knowledge of health professionals has been previously cited as a barrier to AT provision (9). A limited and fragmented level of knowledge of AT amongst personnel which impacts what information and devices they can then offer to the public.

6.6 Results in context

6.6.1 AT for what? 'It's not about managing, it's about flourishing.'

Within the context of AT provision, the people receiving APs are not just looking to survive or get by in life, but to use the APs to bridge the accessibility gaps in their lives and thrive (59).

There are limitations to the current provision models which impact fulfilment of this holistic picture. Such a provision model would need to take full account of the needs and ambitions of disabled people and allow provision to fit these aspirations. However, in practice, there is no centralised approach to provision, and services are divided into functional domains (e.g., mobility, vision, hearing, cognition), each of which is under resource constraints. The segregation of provision into clinical specialisms is not necessarily a problem; it is the lack of integration of such provision which leads people not to understand where they should seek help in the provision or even if there is a service which can help them.

The bio-psycho-social model of disability clearly demonstrates the need to understand the functional limitations of a person's body but acknowledges that a person's psychological wellbeing combined with societal factors determine if they are disabled or not. AT can overcome functional impairments. However, it can do more when provided transparently and collaboratively; full training can help people gain confidence and increase their psychological wellbeing. In contrast, poor provisioning systems, which leave people frustrated and disempowered, can lead to further ill health.

As Judy Heumann clearly stated: "Disability rights are civil rights". AT enables disabled people to live full lives, claim their civil rights, and flourish. This, in turn, leads to less dependency on care and other services.

6.6.2 Missions approach to AT

A mission-led approach to the delivery of action plans which address complex challenges has been demonstrated to be impactful when delivering solutions to complex challenges. A mission-led approach for AT has been advocated previously (60). Missions provide a target to steer economic growth and policy agendas providing the means to focus research innovation and investments (61). For a mission-led approach to be successful, it must be bold, activate innovation across sectors, actors and disciplines, and enable new possibilities of bringing different actors to spur collaboration and help redefine what these cross-sector relationships can look like through a shared common purpose (61). This takes leadership. Within the disability space, we have found that a mission-led approach works best when it is built upon the needs of the community. This is the first step in a 12-step model which was proven to work for the successful, inclusive delivery of London 2012 Olympic and Paralympic Games (62). This is illustrated in Figure 8: 12-step model implementation mode for mission-led disability inclusion. Such an approach would allow for the known returns on investment for AT provision, globally 9:1 for the five

main assistive products (63), with an additional 2:1 when upstream and downstream economic advantages are factored in (64,65), to be realised and, most likely, exceeded.

The 12-step model can be visualised in three phases:

- **Get-ready** contains steps: 1) Community leaders' articulation of needs and priorities; 2) P/political leadership; 3) Clear mission and joint objective setting;4) Time-limited action.
- **Get-set** contains steps: 5) Governance by disabled people and community leaders; 6) Diverse partnerships where everyone can drive change; 7) Expert technical assistance and mainstreamed training 8 Resources, resourcefulness, and tools.
- **Go** contains steps: 9) Inclusive innovation encouraged, 10) Good enough data, scrutiny, and progress management, 11) Culture of excellence (beyond contractual compliance) & consequences of failure (to try).

This is shown in ***Figure 8: 12-step model implementation*** mode for mission-led disability inclusion

Health Tsars' are appointed to attract attention to pertinent issues and priorities. They are often passionate about advocating for change in healthcare and patient management and can be key at shaping a variety of services (66). During the COVID-19 pandemic, the UK Government appointed a vaccine tsar to be responsible for the vaccine procurement, workforce and roll out. This dedicated professional is an example of a mission-led approach from government to drive forward and deliver on complex action plans – AT delivery could benefit from the same approach.

Get Ready

1 Community leaders' articulation of needs and priorities	2 P/political leadership	3 Clear mission and joint objective setting	4 Time limited action

Get-set

5 Governance by disabled people and community leaders	6 Diverse partnerships where everyone can drive change	7 Expert technical assistance and mainstreamed training	8 Resources, resourcefulness and tools

Go

9 Inclusive innovation encouraged	10 Good enough data, scrutiny and progress management	11 Culture of excellence (beyond contractual compliance) & consequences of failure (to try)	12 Reflection and recognition of success

Figure 8: 12-step model implementation mode for mission-led disability inclusion

6.6.3 Analysis of the London 2012 Model in the AT England context

Figure 9 Articulation of the England AT study against the London 2012 Framework. displays how the solutions needed for England's AT delivery coincide with elements of the London 2012 model. This feeds into the recommendations in the following section.

	Elements of Model	AT Articulation for this study
1	Community Priorities	Regular engagement, articulation and scrutiny
2	P/political leadership	Appoint a Tsar and assemble a matrix team
3	Mission	Commit to mission to reduce the AT access gap
4	Time Limited Actions	Disability action plan and white paper(s)
5	Governance	Panel led by disabled people
6	Diverse partnerships	Ensure all can contribute to success
7	Expert TA	Regular research and TA
8	Resources	Workforce support – coordination through Hub
9	Inclusive Innovation	Pilot repair centres & digital solutions
10	Good enough data	Commit to better, regular, data & evidence
11	Striving for excellence	Publish by region. Consequences for failure
12	Reflection & recognition	Celebrate success with public engagement

The research suggests that the steps of this framework do not necessarily follow the same order when used for other projects, and as such the recommendations have been suggested in pragmatic terms according to what is possible in this Parliament and the next. However, as shown in Figure 9 above, action in all twelve of the London 2012 Framework elements is needed to drive change in AT access in England.

6.7 Limitations to the research

This research was commissioned by the Disability Unit; hence it focuses on AT as it impacts disabled people in England. However, many of the findings are useful for older people too and in fact older people did participate in the work. To meet the scope of this work, older persons organisations are not included specifically in the recommendations but might sensibly feature in the next phase of activity.

The rATA is an internationally validated survey; however, it also has several limitations. The data are self-reported, which allows individuals to assess their level of difficulty and need for products but may be affected by their awareness of assistive products and their uses, benefits, or drawbacks. With this online adaption, there was not an assessor present to ensure individuals completed the survey correctly. To mitigate this, Opinium removed incomplete responses before adjustment for national representation and GDI's data analyst amended responses where individuals wrote-in APs in 'other' that had actually been listed in the survey.

There was a lack of available data on Government and centralised procurement practices which limits the ability for this research to fully understand England's current capacity to provide AT and identify system in/efficiencies.

Despite efforts, the KII and FGD do not capture the experiences of all AT domain users and providers. The experiences of those working in hearing aid and glasses provision are not captured here, and it's possible there may be different experiences, capacities, and challenges to these items of AT provision that are not discussed.

The participants of the KII and FGD were a self-selecting group who likely have higher than average awareness of AT provision and practices. Due to the limited time during the study, there may be populations who were not included in our participant pool, particularly from underserved and overstressed groups.

7 Conclusions and Recommendations

7.1 Recommendations

Following the evidence gathered by GDI Hub and in consultation with partners, the following recommendations are suggested for the short, medium, and long term. The temporal nature of the recommendations has not been tested and is suggestive only. Each recommendation is linked to an element of the London 2012 model, as shown in the square brackets e.g. [2012 – 3] refers to the third element of the model from the London 2012 Framework, (Figure 9).

Short-Term Recommendations	Immediate actions could include:
i. [**Mission**] Announce intention to set a national mission to improve AT access. [2012-3]	Commit to a mission to reduce the AT access gap for disabled people in England. Embed the Mission commitments within the Disability Action Plan. Suggested target – reduce unmet need by one third before the election, from 31% to 20%.
ii. **[Leadership]** Appoint an '**AT Tsar**' to take ownership of the agenda (following the success of this model in the Covid-19 vaccine roll-out). [2012-2]	Appoint a senior official with powers to set a mission and efficiently drive change, reporting directly to the Minister for Disabled People. Give them powers to draw support from all government departments to gather data needed to make change, and ability to draw on the Sector Champions (or add more) to advocate and implement.
iii. **[Data]** Improve **AT data to inform** policy making and priorities. [2012-10]	Commit to re-investigating government AT procurement data and give departments 3 months to make recommendations for better data capture. Establish inter-governmental working group to collect data on AT from all government departments and implement a sustainable system for future data collection within 6 months.

		Use data to re-investigate CCA outcomes and address procurement and capacity questions, including informing the structure of the system.
iv.	**[AT Hub]** Invest in an **AT Hub, with regional spokes** to build coordination and capacity. [2012-ALL]	Commit to create a national AT Hub, perhaps in digital form, with physical location "spokes" around the country, building on what already works in some AT domains (e.g., AAC) or other sectors (e.g., Women's Health Hubs). Establish a feasibility study and potential organisation/s that could host regional spokes (such as Centres for Independent Living (CILs).
v.	[**APL**] Validate Assistive Products List (APL) for England. [2012-8]	Use the revised WHO APL 2.0 and community validation event/s, cross referenced with procurement data, to finalise the priority APL for England, including procurement specifications. Ensure this captures advances in mainstream technology.

Medium-Term Recommendations	Actions in the next 6-18 moths could include:
vi. **[Incentivise Coordination]** Disincentivise re-assessment and siloed activities and incentivise trust and co-operation between providers to build a collaborative, transparent service for AT access. [2012-6]	Map AT provision systems and share information to ensure full transparency. Remove contractual and financial incentives to conduct repetitive reassessments and replace them with incentives to encourage collaboration (e.g., in procurement or other contracting). Convene existing providers to make recommendations on how corporations can be incentivised.

vii.	**[AT User Passport]** Following models in other countries and sectors, trial an AT User Passport so assessments and other information follow the person, avoiding duplication of service. [2012-3]	Pilot-test an AT user passport to enable information sharing on assessments and service access in transparent and clear ways. Additionally, explore building routes for self-referral.
viii.	**[Better information between users and policymakers]** Create an AT users forum and embed this group into service delivery decision-making. [2012-5&1]	Establish an **AT User forum** to share information and feedback that will improve service delivery and help identify new products. Invest in an AT helpline to support AT users to navigate the system (perhaps hosted within AT Hubs or spokes). Build the capacity of the disability sector to support AT users.
ix.	**[Workforce Capacity].** Support and grow the AT workforce. [2012-7]	Establish bite sized CPD (Continuing Professional Development) modules for staff in the variety of sectors that serve AT users, to build capacity. Establish a Professional Network for AT professionals. Consider mechanisms to improve the recruitment capacity of the AT workforce needed in the UK.
x.	**[Policy and NHS reform]** Maximise the PM's commitment to NHS reform, and current White Papers to deliver AT. [2012-4]	Conduct an analysis of the ways in which the PM's commitments on NHS reform can integrate the needs of AT provision in the UK. Conduct and analysis of the ways in which the new White Papers on Health and Disability can support the mission and implement.

Longer-Term Recommendations	Actions in the next Parliament could include:

xi.	[Evidence] Invest in the physical spokes and digital AT hub to collect better data, re-running the CCA assessment every 4 years. [2012-11]	Rerun the research every 4 years and publish a 'state of AT in England' report, charting achievements. Invest in digital hub and physical spokes to collect better data.
xii.	[Export] Showcase UK plc's AT capability, considering reducing tariffs on AT in any new trade deals. [2012-2]	Showcase new products and capabilities of UK AT businesses to export. Negotiate AT export (and import) tariff moratorium in new trade deals.
xiii.	[Repair] Pilot and roll-out repair centres for AT by users and others.[2012-9]	Consider mechanisms to enable users to better repair and bespoke their AT, potentially linking local disability centres (CILs or retail locations run by disability organisations) to those with the technical expertise to repair and bespoke AT products.
xiv.	[Celebrate Success] consider cultural activities to celebrate success and engage public. [2012-12].	Use cultural events to overcome stigma and address public backing for AT access in England.

The recommendations have been set out acording to what might be possible immediately, in this parliament, and in the next. But also linked to the London 2012 framework.

7.2 Envisaging an AT Hub

It is clear from the evidence gathered for this report that there a very core gap in terms of leadership; coordination; data and evidence and their application for policy; capacity building in the sector and of the workforce; as well as innovation in the design and efficiency of procurement of AT products and services. Since HMG has committed to explore the idea of an AT Hub, the evidence here would suggest this could be very fruitful and in fact accelerate progress towards an adopted mission. It is likley that this Hub would need both a central (probably digital) locus, and regional (probably physical) spokes; and should build on best practice from domains and regions. A feasibiltiy study would be a helpful next step, ideally alongside the collation of the national procurement dataset and full economic impact analysis.

7.3 Conclusion

This report reveals the complex state of AT in England. While delivery systems tend to return quality products that have a strong, positive impact on people's lives, this process is often slow and stressful to users and providers alike. And startlingly, there is still an access gap of 31% of disabled people not having the assistive products they need to thrive, flourish, or even participate in daily life.

Many disabled people in England benefit from the high expertise and array of products available through public and private delivery systems. When AT is provided, it is generally of good quality and enables people to achieve educational, livelihood and social activities. Still, younger people and those living in London have reported higher levels of unmet need, and this alongside broader unmet needs requires further investigation including an economic impact assessment.

Notably, due to a lack of government data it is not clear how AT devices are being procured by government or at what cost, and it is therefore difficult to recommend methods for country provision optimisation.

The workforce (personnel) critical to providing AT (some of whom are AT users themselves) are motivated to provide the best quality of service but are being disempowered to do so by a lack of resources and support in service delivery. This refers not only to the assistive product a person receives, but also the process of understanding their need and the process of acquiring an AP. Currently, without a centralised system, people are confused and frustrated, and trust is being eroded within the public and workforce. This is both a limitation and a great opportunity, as this workforce would welcome a shift in mindset of AT provision which unlocks the resources they need to create a system that meets people's needs.

Future investment into the AT sector needs to acknowledge the need for repair services to be fully integrated into provision. In parallel, services need to be better joined-up with a focus on helping an AT user thrive, rather than a patchwork approach to overcoming disparate functional impairments. Such an approach would lead to better physical and mental health outcomes of AT users.

There is an opportunity for England, and the UK more broadly, to build on its strengths in AT design and provision models. This could be built into a mission-led approach to AT provision which would shift the mindset from deficit to growth for the sector. Such a shift would necessitate more robust regional hubs which could procure and provide effectively. A national AT "hub" which connects regional "spokes" would enable increased efficiencies in best practice knowledge exchange.

This research paints a complex picture of proliferated services, hardworking and under-resourced personnel, and much good will to make positive change. With strong, committed reform we can turn this into a story of the UK's tradition of global leadership and national success, whereby disabled people use AT to live and thrive to their fullest extent.

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9 Appendices

9.1 Appendix Table 1.1: Participant table from Qualitative structure Key Informant Interviews (KII)

ID	Role	Organisation / Sector
1	Higher Level Teaching Assistant	Specialist Educational Needs Primary School
2	Clinical Specialist Occupational Therapist and Team Lead	NHS Services
3	Prosthetist and Orthotist + prosthesis user	NHS Services
4	Senior Management Team	Private Healthcare Organisation – manufactures AT
5	Policy Advisor	Council / Local Authority
6	Headteacher	Specialist Educational Needs Primary School
7	Communication Lead	School for children and young people with complex needs
8	Communication Teaching Assistant	School for children and young people with complex needs
9	Senior Lecturer in AT for education	University
10	Clinical Technologist	NHS Specialist Services

11	Independent AT Consultant and Director of Non-profit	Self-employed
12	Director of AT services	Disability Charity Organisation
13	Clinical Specialist Occupational Therapist	NHS services (Wheelchair, Prosthetics & Orthotics, AAC & EC)
14	Senior Management Team	NHS Specialist Services
15	Assistive technology and accessibility specialist	Third-sector digital technology agency
16	Assistive technology and accessibility specialist	Third-sector digital technology agency
17	Policy advisor	National government
18	Head of services	Home Adaptations Charity
19	Occupational Therapist	Local Authority
20	Clinical Lead	NHS Specialist Services
21	Speech and Language Therapist	NHS Specialist Services
22	Consultant in Rehabilitation Medicine	NHS Services

24	Assistive Technology Manager	Disability Charity
25	AT user of IT, electric wheelchair, car adaptations, home adaptations	-
26	Manager	Global Organisation; Manufacturer & Distributor of AT
27	Long-term conditions lead in assessment services	NHS Services
28	Business founder and Researcher And AT user of IT accessibility features	CIC working in neurodiversity

9.2 Appendix Table 1.2: Focus Group 1: Provision

ID	Role	Organisation
29	Clinical Lead	NHS Specialist Services
30	Speech and Language Therapist	NHS Specialist Services
31	Senior Management Team	Independent Assistive Technology Consultancy
32	Assistive Technologist	Disability Organisation

9.3 Appendix Table 1.3: Focus Group 2: Policy

ID	Role	Organisation
33	Accessibility Specialist	Disability Organisation

ID			
34	Senior Management in Adult Social Care	Local Authority	
35	Civil Servant	Government Department	
36	Policy Advisor	Local / Council Services	
37	Senior Policy Team AT user	Policy Organisation	
38	Senior Policy Team AT user	Policy Organisation	

9.4 Appendix Table 1.4: Focus Group 3: People

ID	Role	Impairment	AT used
39	Researcher	Muscular Dystrophy	Powered Wheelchair, Wash / Dry toilet, Lifting Frame, Profiling bed, grabby sticks, hoist
40	Member of Pathfinders	Duchenne Muscular Dystrophy	Possum, XAC, Electric Wheelchair and Others
41	Artist and Coach	Blind	JAWS, NVAD, Narrator, VoiceOver (Mac), VoiceOver (iPhone), Alexa, Talking Products, etc
42	Volunteer and Trustee for multiple positions	Muscular Dystrophy	Portable ventilator, cough assistor, powered wheelchair, PEG pump , profiling bed, ceiling track hoist , portable hoist, possum environmental control system, telecare community alarm, Alexa, suction machine, nebuliser machine, electric door opener , robotic vacuum cleaner, smart light bulbs, smart plugs , press button attendant call system, intercom voice call , PC with onscreen

			keyboard & tracker ball. smart phone (small & light weight), app for hearing aids, hands free button on land line plus amp, voice amplifier portable .

9.5 Appendix Table 1.5: Focus Group 4: Product

ID	Role	Organisation
43	Speech and Language Therapist and Director	AT developer
44	Civil Servant	Government Department
45	Civil Servant	Government Department
46	Occupational Therapist	NHS services
47	Senior Management Team	Disability Organisation
48	Speech and Language Therapist	Social enterprise

9.6 Appendix Table 1.6: Focus Group 5: User-led Organisations

ID	Role	Organisation
49	Representative	Disabled Peoples Organisation (SE England)
50	Policy Lead	Disabled Peoples Organisation (SE England)
51	Representative	Disabled Peoples Organisation (SE England)
52	Senior Management Team	Disabled Peoples Organisation (East England)
53	Senior Management Team	Disabled Peoples Organisation (West England)
54	Senior Management Team	Disabled Peoples Organisation (SW England)

55	Senior Management Team	Disabled Peoples Organisation (North England)
56	Policy Lead	Disabled Peoples Organisation (National)
57	Service Lead	Disabled Peoples Organisation (West England)
58	Senior Management Team	Disabled Peoples Organisation (South East England)
59	Senior Management Team	Disabled Peoples Organisation (North West England)

9.7 Appendix Table 2: Disability Definitions

1. Office of National Statistics (ONS) & UK Census (respondent answers 'yes – a little' or 'yes – a lot')	
1	Do you have a long-standing physical or mental health condition, illness, or impairment that reduces your ability to carry out day-to-day activities? By long standing we mean lasting or expected to last 12 months or more.
2. Self-identify (respondent answers 'yes')	
1	Do you identify as having a disability?
3. WHO need for APs (respondent answers 'a lot' of difficulty or 'cannot do' in any of the following domains)	
1	Mobility - Without assistance or support from any people or equipment, do you have difficulty sitting, standing, walking or climbing steps?
2	Vision - Do you have difficulty seeing, without using any devices?
3	Hearing - Do you have difficulty hearing, without using any products?
4	Communication - Do you have difficulty speaking or communicating without the use of any products?
5	Remembering - Do you have difficulty remembering or concentrating without the use of any products?

6	Self-care - Do you have difficulty with your self-care without the use of any products?
4. Impairment Harmonised Standard (Respondent selects at least one category from 1-9 to 'indicate any type(s) of impairment(s) significantly impacting [their] ability to undertake particular functions')	
1	Vision (for example blindness or partial sight)
2	Hearing (for example deafness or partial hearing)
3	Mobility (for example walking short distances or climbing stairs)
4	Dexterity (for example lifting and carrying objects, using a keyboard)
5	Learning or understanding or concentrating
6	Memory
7	Mental health
8	Stamina or breathing or fatigue
9	Socially or behaviorally (for example associated with autism spectrum disorder (ASD) which includes Asperger's, or attention deficit hyperactivity disorder (ADHD))
10	None of the above

9.8 Appendix 3: Full Literature Review

9.8.1 Introduction

This review defines AT and outlines who needs it. For England, it assessed what is currently known about AT. It provides an overview of providers and funders of AT. It also includes discourse concerning improving access to AT, the challenges for the provision of and current research and development relating to assistive technology in England. A critical evaluation of recent research articles centred on AT within England and an appraisal of currently accessible policy documents Is presented.

9.8.2 What is assistive technology: globally and in the UK?

The World Health Organization (WHO) defines AT as *"the application of organised knowledge and skills related to assistive products, including systems and services"*, while defining assistive products as products that *"maintain or improve an individual's functioning and independence, thereby*

promoting their well-being. Examples of assistive products include hearing aids, wheelchairs, communication aids, spectacles, prostheses, pill organisers, and memory aids"

The WHO have organised assistive products into six categories:

1. Cognition (e.g. pill organisers, Global Positioning Systems (GPS), personal emergency alarm systems)

2. Communication (e.g. communication boards/books/cards, communication software, recorders)

3. Hearing (e.g. hearing aids, alarm signallers with light/sound/vibration, closed captioning displays)

4. Mobility (e.g. wheelchairs, crutches, prostheses)

5. Vision (e.g. spectacles, braille displays, white canes)

6. Self-care and environment (e.g. grab-bars/handrails, chairs for shower/bath/toilet, incontinence products)

In the UK, APs can be classed as medical devices, regulated by the UK Medical Devices Regulations 2002, or an 'aid for daily living'; their classification depends on the claims made by the manufacturer [5]. Furthermore, the UK Medicines & Healthcare products Regulatory Agency define assistive technology as: *"Products or systems that support and help individuals with disabilities, restricted mobility or other impairments to perform functions that might otherwise be difficult or impossible. These devices support individuals to improve or maintain their daily quality of life by easing or compensating for an injury or disability."*

Under the UK Equality Act of 2010 [5], a person is disabled "if you have a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities." 'Substantial' is defined as more than minor or trivial, e.g., it takes much longer than it usually would to complete a daily task, and 'long-term' means 12 months or more.

9.8.3 World Health Assembly AT Resolution (WHA 71.8) and Member State obligations

The 71st World Health Assembly (WHA) adopted resolution WHA71.8 in May 2018 (1), which advises all WHO Member States, including the UK, to work towards improving access to assistive technology. The resolution outlines that:

"…the inclusion of assistive technology, in line with countries' national priority and context, into health systems is essential for realising progress towards the targets in the Sustainable Development Goals relating to universal health coverage, inclusive and equitable quality education, inclusive and sustainable economic growth, full and productive employment and decent work for all, reducing inequality within and among countries by empowering and promoting the social, economic and political inclusion of all, making cities and human settlements inclusive, safe and sustainable, and providing universal access to safe, inclusive and accessible green and public spaces, particularly for persons with disabilities" [17:1].

Within the resolution, it requested the WHO to prepare the Global Report on Assistive Technology [19] published in 2022. The report outlined that the "benefits of investing in assistive technology often outweigh the cost, both on an individual and a societal level" [19].

9.8.4 Assistive technology need and benefits

As AT covers a wide range of products and services and is used by a diverse range of people (people with a physical or mental health condition or disability, undergoing rehabilitation, and the ageing population) there is no single source which provides information on the number of AT users in England. Below we discuss the global need for AT, specific findings on the need in the WHO European Region and data from various sources on the need both in England and the UK.

The recently published Global Report on Assistive Technology (2022) stated that one in three people, or more than 2.5 billion people require one or more AP and that as the global population ages and the prevalence of noncommunicable diseases increases, this number is expected to grow to over 3.5 billion by 2050 [19]. Results from population surveys in 29 countries conducted for the report found that 10% to 69% of people reported needing APs.

In 2021, the WHO conducted a scoping review to assess the coverage of assistive technology in countries in their European Region to understand the prevalence of the need for and access to AT [12]. Of the 103 publications identified in this review, the UK was the most represented country with 30 publications specifically related to the UK and an additional 4 multi-country publications. These covered all six functional domains: vision (6 publications), communication (5 publications), hearing (3 publications), and cognition, mobility, and self-care (1 publication each). The review concluded that caution should be taken when interpreting results related to the prevalence of need as data came from a limited number of publications. They presented the prevalence of the need for AT in the European Region in each of the six assistive product categories:

1. *Cognition* - two publications addressed the prevalence of cognitive impairment need for assistive technology and reported it as 2.3% and 1.5% (of the total population).

2. *Communication* – reported prevalence of need for communication aids ranged from 0.02% to 10.5%.

3. *Hearing* - prevalence of people with hearing difficulties ranged from 10.5% to 60.8%.

4. *Mobility* - two publications provided nationally representative information on the need for mobility aids, 3.75% and 17.5% respectively.

5. *Vision* - the prevalence of people with visual impairment in publications focusing exclusively on children and/or adolescents ranged from 5% to 50%. For the remaining publications, the prevalence ranged from 14% to 39.7%.

6. *Self-care and environment* - three publications provided information on the prevalence of the need for assistive technology for self-care, which ranged from 10.9% overall to 21% for incontinence products and 66% for bathroom adaptations (for people with amyotrophic lateral sclerosis).

Information on the prevalence of the need for AT in England and the UK is presented below. Where possible, information is presented for England, where this was not possible, information is presented for the UK.

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In the first WHO rapid Assistive Technology Assessment (rATA) conducted in the UK in 2021 (7), the assistive products that people selected as being used most often were spectacles, hearing aids, and grab-bars/handrails. Considering these assistive products, current user need was examined:

- It was reported that in 2020, 59% of people in the UK wear glasses (8), equating to approximately *39,589,000* people [9].

- It was recently reported (2023) that 2 million people use hearing aids in the UK, but that *6.7 million* could benefit from using them [10].
- It was reported in the English Housing Survey 2019 to 2020 that around *1.9 million households* in England had one or more people with a health condition that required adaptations to their home [11].

In addition, the prevalence of the need for AT outside of these three APs was explored. This information does not consider all potential users but indicates the current need:

- People with a disability are likely to require access to assistive technology. The results of the latest Family Resources Survey (2020 to 2021) [12] show that the number of people who reported a disability in England is *12.2 million* (22% of the population), an increase of 2.8 million from 2010 to 2011 (9.4 million) [13]. Within England, the highest prevalence of disability was in the Northeast region (31%) and the lowest was in Inner London (14%). The total number of people who reported a disability in the UK was 14.6 million. The prevalence of disability is higher among older adults (42% of State Pension age adults) and working-age adults (21%), and lower among children (9%). Mobility impairment was the highest reported impairment (46%), followed by Stamina/breathing/fatigue (33%) and dexterity (23%). People with a disability are less likely to be employed (48%) compared to non-disabled people (80%). The government have acknowledged that assistive technology can contribute to removing barriers to work for people with a disability [14]. A 2018 report from the Work and Pensions Committee stated that the Department for Work and Pensions should work to ensure disabled people and employers are fully aware of assistive technology and the benefits it can provide (15). It outlined that access to assistive technology provides the opportunity to close the disability employment gap and *"transform our economic outlook, improve workforce efficiency and break the deadlock on the economy enforced by sluggish productivity"* (15:15). The latest figures show that 2.8 million people in England and Wales are claiming Personal Independence Payment (PIP), a benefit provided by the government to people with a long-term physical or mental health condition or disability who have difficulty doing certain everyday tasks or getting around because of their condition (16).
- TSA, the industry and advisory body for technology-enabled care in the UK produced a report in 2020 (17) which examined the response and redesign of technology-enabled care during the COVID-19 pandemic. They reported that approximately *1.7 million* people rely on technology-enabled care in the UK. The assistive products categorised as technology-enabled care include personal alarms and GPS locators.

- A report by Communication Matters in 2013 estimated that just over 0.5% of the UK population (529 people per hundred thousand of the population) could benefit from some type of augmentative and alternative communication (ACC) (18).
- The latest information (2022) from the National Wheelchair Data Collection (19) reported that there are *579,067* people accessing wheelchair services in England.

The National Institute for Health and Care Excellence (NICE) in the UK provides guidance, advice, quality standards and information services for health, public health and social care. Numerous

reports from NICE have appraised the application of AT, outlining user profiles, their requirements, and the corresponding devices. Nevertheless, these reports concentrate on individual clinical conditions or particular long-term health and social care necessities, which fall outside the scope of this paper. Examples of NICE guidance recommending assistive technology are the 2022 Guidance for disabled children and young people with severe complex needs which provides recommendations on the provision of communication aids (20) and the 2019 Guidance for cerebral palsy in adults which recommends the use of electronic assistive technology (21).

9.8.5 Need, demand, supply and user satisfaction with AT in England

In the first WHO rapid Assistive Technology Assessment (rATA) conducted in the UK in 2021, a total of 259 surveys were collected, with 58% of respondents being female and 42% male, and 95% of respondents being from England. Most respondents were adults aged 18-64 years (64%), followed by children (24%) and adults 65+ years (12%). A large percentage of respondents (78%) reported no difficulties with mobility, hearing, communication, cognition, and self-care, but 60% reported difficulty with their sight. More functional difficulties were reported by adults, with 77% of adult respondents not identifying as disabled, but 70% currently using APs and 15% having unmet assistive product needs.

Around 63% of the respondents reported using AP, with the top three being spectacles (38%), hearing aids (6%), and grab bars/handrails (5%). The most commonly selected "other" AP were contact lenses (10 respondents), computer software i.e., speech-to-text (5), as well as electric can openers and stair lifts (3 each). Most AP (73.9%) were purchased from the private sector, with more children obtaining them from the public sector compared to adults. Over half (57%) were paid for out-of-pocket, and 22% were provided through government sources. Most APs for adults were paid out-of-pocket, while for children, they were mostly paid for by the government. Most respondents who used APs (72%) had spent money on them in the last 12 months, with an average cost of ±£340 - £423, ranging from £10 to £3000. Two-thirds of respondents travelled less than 5km to access their three most important AP, while 27% travelled between 6 and 25km. More urban respondents travelled less than 5km.

Most respondents reported high satisfaction with their assistive products, AT services, and repair, maintenance, and follow-up. The main reasons for dissatisfaction with assistive products were fit/size/shape, replacement needed, and durability. The main reasons for service dissatisfaction were quality of care and waiting time. Respondents reported that their APs were suitable for their homes and surroundings and mostly or completely helped them do what they wanted. They also reported being able to use their APs as much as they needed in the places they visited. An unmet need for APs was reported by 18.5% of respondents, with adults 65+ years having a greater unmet need (37.5%) compared to adults 18-64 years (19.4%) and children (6.5%). "Cannot afford" and "Lack of support" were the most cited barriers to accessing APs. Many reported that the Covid-19 pandemic exacerbated the situation and was a significant barrier.

Although the response to this survey was limited, the results still provided valuable insight into using assistive products in the UK. Most APs (57%) were paid for out-of-pocket, making them inaccessible to some. There was an unmet need for assistive products for 18.5% of respondents and "Cannot afford" was a common barrier to accessing them. To improve access, there is a need for greater awareness of the range of products and services under the term "assistive technology." A large-scale national questionnaire would raise awareness and improve access in the UK.

9.8.6 Provision and funding mechanisms for assistive technology in England

The public, private and non-profit sectors are providers of assistive technology in England. Across the UK, many private organisations provide assistive products and services, and non-profit organisations support people who require AT. The British Healthcare Trade Association[1] (BHTA) is the UK's largest association of companies that manufacture and sell AT, with over 400 members, including retailers, installers, service providers, distributors, and manufacturers. Whilst not an exhaustive list, 25 non-profit organisations involved in assistive technology provision in the UK are listed in the 2022 Assistive Technology report based on the UK [22].

The UK Equality Act 2010 (4) states that employers are required to make "reasonable adjustments", which includes access to relevant AT, to any elements of the job which place a person with a disability at a substantial disadvantage compared to non-disabled people. The Health and Safety Executive (HSE) has created a set of principles aimed at assisting employers in facilitating the employment of disabled people, as well as helping them to maintain their positions [23]. The guidance provided by the HSE is intended to aid the support of all workers, especially concerning equality and diversity. The HSE advises employers to seek guidance from the National Health Service (NHS) England regarding specific health conditions.

The following section provides an overview of the public sector provision of assistive technology in England which is drawn from available information and may not be comprehensive due to the complex nature of service provision. In England, the government provides full or partial funding for many APs and services under health, social care and support, education, housing and employment schemes. These include:

- The National Health Service (NHS) is a publicly funded healthcare system that provides comprehensive healthcare services to all people living in England. One of the core policies of the NHS includes the principle of "free at the point of use," which means that healthcare services are provided to patients without any direct charge at the time of use. This policy allows individuals to access necessary healthcare services without financial barriers, ensuring that everyone has access to quality care regardless of their financial situation. The Health and Care Act (2022) [24] resulted in significant changes to the structure of the NHS as its main aim is to make it easier for health and care organisations to deliver joined-up (integrated) care for people who rely on multiple different services. The act includes the formalisation of the Integrated care systems (ICS), statutory bodies with power over NHS commissioning and spending at a local level. ICS, of which there are 42 in England, brings the NHS, local authorities and 3rd sector organisations, such as NGOs, together to operate in such a way that health and care are integrated. Within ICSs, there are two bodies: 1) Integrated Care Board (ICB), a body responsible for NHS services, funding, commissioning, and workforce planning across the ICS area, and 2) Integrated Care Partnership (ICP) which is responsible for the ICS-wide strategy and broader issues such as public health, social care, and the broader determinants of health. These ICBs replace the previous Clinical Commissioning Groups (CCGs) and focus on core NHS services, with responsibilities including NHS funding, commissioning, and workforce planning.

- NHS Trusts across England provide assistive technology to people through various services, including those provided by allied health professions like podiatrists, occupational therapists, physiotherapists, prosthetists and orthotists and speech and language therapists. Referral routes to NHS services vary across England, but typically, this occurs via a GP, consultant, or healthcare professional. In some areas, self-referral to certain services is available.

- NHS England commission Specialised Assistive Technology Services (25). These services are provided through several organisations, some of which only provide Augmentative and Alternative Communication (AAC) services, others only Environmental Control (EC) Services, and some both. EC services include prosthetic, orthotic, posture and mobility services, home control and computer access.

- The Digitising social care fund (26) introduced in 2021 provides funding of £8.2 million received from the NHS Transformation Directorate (NHSX) to support the digitisation of social care. The funding is to pilot digital social care technology with integrated care systems (ICSs) to include fall prevention technologies that can reduce the frequency and severity of hospital admissions.

- The Better Care Fund (BCF) [27] programme, which was launched in 2015, supports local systems to deliver the integration of health and social care. It is a collaboration between the Department of Health and Social Care, the Department for Levelling Up, Housing and Communities, NHS England and Improvement, and the Local Government Association. The programme established pooled budgets between the NHS and local authorities, aiming to reduce the barriers often created by separate funding streams. In 2022 to 2023 a minimum of £7.2 billion was committed to enabling people to live independently and get the care they needed, by funding, for example, adaptations to homes for disabled people and rehabilitating people back into their communities after a period in hospital.

- The Personal Independence Payment (PIP) [28] scheme is available to help with extra living costs if people have both a long-term physical or mental health condition or disability, and experience difficulty doing certain everyday tasks or getting around because of their condition. The scheme has two parts and two rates within these parts; if people need help with 'daily living' tasks there is a lower weekly rate is £61.85 and a higher rate of £92.40, and for help with 'mobility' tasks there is a lower weekly rate of £24.45 and a higher rate of £64.50. This scheme began to replace the Disability Living Allowance (DLA) scheme for most adults in 2013.

- The Disability Living Allowance (DLA) scheme now serves people under 16 years of age and those born on or before 8 April 1948 and has two parts [29], and two or three weekly rates within these parts. If people need help with the 'care component' there is the lowest rate of £24.45, the middle rate of £61.85, and the highest rate of £92.40. If people need help with the 'mobility component' there is the lower rate of £24.45 and the higher rate of £64.50.

- The Access to work [30] scheme is available to help people get employment or stay employed if they have a physical or mental health condition or disability. Currently, people can claim up to £65,180 annually through this scheme, which includes the provision of assistive technology. The assistive products included in the scheme comprise literacy support software, speed recognition software and adapted equipment.

- Disabled Facilities Grants (DFG) [31] is a grant (up to £30,000 in England) available from local authorities for people with a disability who need to make changes to their home. In 2022, guidance on the grant was published which outlined specific advice on assistive technology

[32]. It outlined which assistive technology could be included as part of a DFG award - these were assistive technology 1) to facilitate access to and movement within the dwelling (e.g., stairlift), 2) for preparation and cooking of food (e.g., adapted and height adjustable cooking surfaces, 3) to access and use a bedroom (e.g., ceiling track hoists), and 4) to control sources of poor, light and heat (e.g., smart hubs and automated light switches).

- The Disabled Students' Allowance (DSA) [33] serves to support disabled students with additional costs they may face in higher education because of their disability, including assistive and accessible technology (technology that can be used by people with a wide range of abilities and disabilities). It currently provides undergraduate and postgraduate students with up to £26,291 a year in support. Lord Holmes produced a report in 2022 [34] which focused on the DSA and provided recommendations to the Government. He reported that in 2019/20 only 29% of students with a known disability (75,000/261,620) were receiving the DSA. Recommendations in the report included addressing the lack of knowledge of the scheme amongst potential recipients and ensuring sufficient funding from the Department of Education to finance the scheme.

9.8.7 Improving access to assistive technology in England

Various reports suggest that access to assistive technology in England is sporadic and inconsistent, with significant regional variations in the availability and provision of assistive technology [7,35]. This is also reflected in policy documents such as the NHS Long Term Plan [36], which recognises the need to improve support for individuals with long-term conditions. The plan stated that the NHS will support these individuals through access to mobile monitoring devices and connected home technologies. The following section provides summaries from recent publications on AT in England and the UK, highlighting issues with AT service provision and providing recommendations. Following this, information on government initiatives to improve access to AT is presented.

- Greenhalgh et al. [37] conducted research to define quality in telehealth and telecare in 2015, with the aim of improving the proportion of patients who receive appropriate, acceptable and workable technologies and services to support them in living with illness or disability. They concluded that technological advances should be underpinned by industry and service providers following a user-centred approach to design and delivery. They stated that the sector required: "[1] a shift in focus from product ('assistive technologies') to performance ('supporting technologies-in-use'); [2] a shift in the commissioning model from standardised to personalised home care contracts; and [3] a shift in the design model from 'walled garden', branded products to inter-operable components that can be combined and used flexibly across devices and platforms."
- In 2016, Newton et al. [38] explored the views and experiences of people with dementia, their family/carers and GPs on their knowledge and experience of accessing information about, and use of, assistive technology in dementia care. Results showed that people with dementia and their families usually gained knowledge of assistive technology from personal experience rather than from health and social care professionals. GPs usually gained their knowledge from experiential, patient-led learning. They concluded that GPs, and all doctors involved in the care of older people, should be equipped with the relevant knowledge to ensure their patients receive appropriate information and support to enable them to live independently for as long as possible.

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- Campling et al. [39] examined barriers to the uptake of telehealthcare devices in 2017., The assistive products included (pill dispensers, personal alarms, falls monitors and GPS locators), from the perspective of the users and people involved in the healthcare supply chain (professional bodies, user groups, regulators, providers, county councils, charitable bodies, manufacturers and distributors, research funders and organisations, and trade associations). Findings showed that users were unaware of the range of products available and there was a lack of independent expertise and knowledge regarding products among healthcare professionals. They concluded that awareness campaigns for users and healthcare professionals and appropriate funding mechanisms for users to gain access to products were required.
- Chockalingam et al. [40] conducted a UK national cross-sectional survey in 2017, obtained through a freedom of information request, which examined orthotic service provision in the NHS. While a low response rate hindered the ability to provide a complete national picture of orthotic service provision, large discrepancies in service provision (e.g., waiting times for appointments and orthotic products) were evident across services. Results showed that some services appeared to not accommodate the needs of children, with waiting times of 20 weeks for routine and 8.2 weeks for urgent appointments. Also, long waiting times of up to 20 weeks for the supply of paediatric ankle foot orthoses (AFOs), usually provided to children with long-term disabling conditions, were reported. They suggested standardising appointment times across the NHS and providing guidelines on product entitlements for patients and their lead times would promote equity.
- Jama et al. [41] examined the availability of assistive communication devices for patients with hearing loss at reception desks and in patient waiting areas in Audiology and Ear, Nose and Throat (ENT) clinics in NHS hospitals in England in 2019. They identified a shortage of assistive communication devices, with devices available in 64% of Audiology, 42% of ENT and 71% of shared Audiology and ENT reception areas; an induction loop system was the most common device. The authors stated that healthcare service providers must recognise their legal obligation to ensure that their services are made more accessible to patients with hearing loss, the use of multimodal assistive technology ensures that more patients can benefit, and that staff awareness and training was essential to improve the quality-of-service provision.
- McCaughan et al. [42] examined the perspectives of 24 adults with knee instability regarding fitting, acceptability, effectiveness, and use of orthoses and reported time constraints and delays in orthotic service provision in 2019. They discussed the importance of having enough time during fitting appointments, as time pressures were perceived as constraining orthotist–patient communication regarding the new device and any adaptations to gait that might be needed. Participants reported frustration and disappointment with delays in manufacturing and delivering new shoes to be used alongside their orthosis.
- Tedesco Triccas et al. [43] explored the assessment and service-delivery processes of assistive devices for people with neuro-disabling conditions (multiple sclerosis, cerebrovascular disease and Parkinson's disease) experiencing physical disability by healthcare professionals in the UK in 2019. They surveyed 231 healthcare professionals (93 occupational therapists, 136 physiotherapists and 2 assistant practitioners) and found that standardised operating procedures for assistive product provision were not being carried out within the UK. There was an inequity in access to assistive products across regions and delays in provision dependent on the size of the assistive product, the size of the adaptations needed for the installation of assistive products and a lack of coordination between services and funding.

- The Department of Education funded a literature review on assistive technology in education in 2020 [44]. Evidence from 2005 to 2019 was reviewed with 950 documents

identified, of which 96 were literature reviews. 30 evidence reviews provided moderate to strong evidence concerning the efficacy of specific AT applications, with most of the identified research examining augmentative and alternative communication (AAC) products. It stated that assistive technology is an under-utilised intervention in education and that coordinated efforts from stakeholders (students, parents, educators, administrators, policymakers, developers, service providers, and researchers) were needed to realise the potential of assistive technology in education.

The UK Disability Survey was conducted in 2021 [45] to inform the UK Government's National Disability Strategy [46]. Disabled people reported improved access to appropriate equipment (for example wheelchairs, hearing aids, and personal care products) would improve their lives. The National Disability Strategy [46] published in 2021 outlined the government's actions to improve the everyday lives of all disabled people. It charted a commitment from the cabinet office to explore the establishment of a world-leading Centre for Assistive and Accessible Technology and to assess the assistive and accessible technology needs of disabled people in England. In December 2022, the government confirmed that a new Disability Action Plan would be consulted on and published in 2023 [47] which would set out the practical action ministers across Government would need to take over the next two years to improve disabled people's lives.

In March 2022, the government published a white paper, People at the Heart of Care [48], which set out a 10-year vision for how they would transform support and care in England. The paper highlighted the following benefits of assistive technology for people in need:

- It provided a story from an assistive technology user describing how assistive technology, provided by Leonard Cheshire's Assistive Technology team, had benefited her life, giving her "access to, and control over, her environment, which she hasn't had in years."
- It stated, "We want more people to benefit from home adaptations to meet their needs, and therefore we will commit a further £570 million per year (between 2022 to 2023 and 2024 to 2025) to provide funding to local areas to deliver the Disabled Facilities Grant."

- It stated: "…we want to raise awareness among people, their families and those providing care of how assistive technology can support people to live independently."
- Within its section on "Providing the right care in the right place at the right time" it had a sub-section on "Using the full potential of technology to support people's lives and aspirations" which stated that "When technology is embedded seamlessly into care and support services, it can be transformative, helping people to live happy, fulfilled lives in their homes and communities."
- It outlined the vision for the potential for use of assistive technology for people, families and unpaid carers, and adult social care providers and staff. It asked commissioners, integrated care systems (ICSs) and NHS partners to integrate technology into their care and support plans and suggested the UK industry and innovators should develop care technologies to meet the demands of global demographic trends and ageing populations.

Following the publication of this white paper Tunstall Healthcare and the County Councils Network (CCN) published a report in February 2023 titled "Adopting the right technology to transform social care" [49], to help local authorities and Integrated care systems (ICS) identify the options they have for using the available funding most effectively. In February 2023, the Department of Health and Social Care published its first-ever medical technology strategy [50]. While not all assistive technology is considered medical technology, assistive technology including digital health and software and prostheses are categorised as medical technology. The strategy outlines how the department "will ensure the health and social care system can reliably access safe, effective, and

innovative medical technologies that support the continued delivery of high-quality care, outstanding patient safety and excellent patient outcomes in a way that makes best use of taxpayer money" [50:5]. The strategy focuses on three objectives, the right product, at the right price, and in the right place. It outlines four priority areas: [1] resilience and continuity of supply, [2] innovative and dynamic markets, [3] enabling infrastructure, and [4] specific market focuses.

The challenge of improving access to assistive technology is not isolated to England, as reported in the Global Report on Assistive Technology [19], it is a global issue. To enable the tracking of improvements in access to assistive technology across countries in 2022, the WHO published a set of indicators to measure Member States' progress in improving access to assistive technology up to 2030 [51]. These indicators measure system preparedness in terms of governance; legislation; public budget; financing mechanisms; regulations and standards; collaborations and initiatives; service provision coverage; workforce availability; and training.

These indicators also highlight that assistive technology provision needs to shift away from a medical model that focuses solely on the individual's impairment and instead adopts a more holistic, social model approach that considers the broader social and environmental factors affecting access and participation. Additionally, a social model approach can promote a more inclusive society that recognises and accommodates diversity, rather than marginalising and stigmatising disabled people [52]. Recent research by dos Santos et al. and Kapsalis et al. has emphasised the importance of considering the social and environmental factors that can impact the use of assistive technology, such as social stigma [53] and lack of accessibility in public spaces [54].

9.8.8 Existing challenges related to assistive technology provision in England

Workforce shortages in health and social care

A report from UK Parliament in 2022 [55] highlighted that almost every healthcare profession was facing shortages and that the number of vacancies had also increased in the adult social care sector. It reported a vacancy rate of 9.7% in the medical and nursing sectors of the NHS and that there were 165,000 vacancies in adult social care. The staff shortages are not limited to doctors and nurses and include allied health professions such as speech and language therapy. The potential factors reported as contributing to the staff shortages were a lack of long-term workforce planning by the government and the NHS; Brexit leading to a loss of staff coming from the EU; concerns over pay; and job pressures due to increasing staff shortages. The King's Fund also published a report on NHS staffing shortages in 2022 [56]. The cause of the shortages it identified were difficulties in workforce forecasting, a tendency to train too few staff in the UK, and the insufficiently strategic use of international migration to compensate.

Issues with assistive technology provision systems

Complicated processes and a lack of knowledge about processes among potential users for accessing assistive technology, as well as a lack of coordination between various delivery mechanisms have been reported in Europe [12]. The 2022 NICE guidance for disabled children and young people with severe complex needs [20], highlighted that while specialist ACC services exist within local and NHS England specialised services, it was the committee's experience that these services were not well known and therefore underused.

The untimely provision of assistive technology

The OECD reported in 2019 that since 2008, the UK health system budgets have not kept pace with the growing demand for services, leading to increased waiting times and provider deficits (57). This is corroborated by the findings in the recent publications on assistive technology in England and the UK discussed above [39,40,43].

Lack of knowledge and training related to assistive technology

Limited knowledge among and training of healthcare professionals and other frontline staff in assistive technology has been identified as one of the main barriers that impact assistive technology provision for users [12]. This is supported by the recent assistive technology publications discussed above [38,39,41]. Also, in November 2022, the All-Party Parliamentary Group for Assistive Technology announced that they were beginning work on a new report on Assistive and Accessible Technology Awareness and Training for Front Line Professionals [58]. The WHO review [12] also reported that limited information available to potential users about assistive products and their accessibility was commonly mentioned as a barrier to accessing assistive technology, this was echoed in results of the 2021 UK WHO rATA [7], with respondents showing a lack of awareness of the available range of assistive products and services.

The current UK economic climate

The British Healthcare Trade Association (BHTA) recently conducted a survey (2022) [59] of healthcare companies providing assistive technology. They have reported that companies are facing financial challenges following the pandemic, global supply chain delays, and uncertainty in the post-Brexit regulatory transition. The survey found that, two out of five companies were considering reducing the amount of stock they produce or distribute due to ongoing operational pressures, one-third of companies were considering cutting employees from their businesses, 29% of companies will focus on other international markets, causing a drain of healthcare jobs and investment from the UK to Europe. 84% of companies believed that the challenges they face are not well understood by the UK Government; and nine out of 10 companies would like to see financial support, greater regulatory certainty, and reform of red tape and regulations to ease operating pressures for healthcare businesses.

Financial affordability of assistive technology

Financing assistive technology is often reported as a barrier to potential users [12]. As identified in the UK WHO rATA in 2021 (7), over half of the respondents paid out-of-pocket for their assistive technology.

Acceptability of assistive technology

The use of assistive technology can draw attention to otherwise invisible limitations, with some people afraid of stigmatisation from using assistive technology, particularly hearing aids [12].

Lack of research on assistive technology

The WHO review of assistive technology in the European region [12] reported that some healthcare professionals identified the lack of robust research evidence as one of their main reasons for not recommending assistive technology to their patients. The review stated that it would be helpful if researchers agreed on standards for data collection to access the prevalence of the need for assistive technology. Additionally, often the NICE guidelines highlight a lack of research evidence on assistive technology. For example, the 2018 guidance for care and support of people growing older

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with learning disabilities [60] stated that there was no available evidence on the effectiveness and cost-effectiveness of assistive technology for supporting older people with learning disabilities and their ageing family carers.

Impact of the digital switchover on assistive technology services

Analogue phone lines are being turned off across the UK, a process that will be complete by 2025 [61]. This poses an issue as the majority of the critical alarm connectivity in the UK relies on analogue technology. Challenges include the reduced reliability of digital connectivity, which could lead to failed calls to alarm-receiving centres used by vulnerable people, an associated rise in safeguarding issues, and the cost of replacing analogue devices with digital devices [62].

9.8.9 Research and development relating to AT technology in England.

The National Disability Strategy [63] reported on the significant support for innovation in the development and improved access to assistive and accessible technologies (ATech). The UK Research and Innovation (UKRI) invested £58.4 million in research and development related to assistive technology in 2019 to 2020, and to date the Industrial Strategy Challenge Fund invested £1.4 million in assistive technology projects. It stated, "We will go further to increase innovation and develop new products that will improve disabled people's everyday lives." It also reported investing up to £1 million in 2021 to 2022 to develop a new world-leading Centre for ATech. The Department for Business, Energy and Industrial Strategy committed to "challenge UKRI and other research stakeholders to use future innovation challenges to accelerate innovation in assistive technologies" [64]. The Assistive technology research and development work: 2020 to 2021 report [65] on government-funded research to improve equipment for disabled and older people highlighted developments in priority setting and funding. Within the report annex, it listed 99 assistive technology research and development projects. The reported developments included:

- The James Lind Alliance Priority Setting Partnerships;
- relevant National Institute for Health (NIHR) research calls;
- a potential partnership between the Engineering and Physical Sciences Research Council (ESPRC) and NIHR to commission research that focuses on transforming care and health at home and/or enabling independence;

- the UK Research and Innovation (UKRI) Industrial Strategy Challenge Fund (ISCF): the Healthy Ageing Challenge;
- relevant publications from the Department for Education; and
- the National Disability Strategy's planned Centre for Assistive and Accessible Technology.

The National Rehabilitation Centre will open in 2024 and will be a 70-bed NHS rehabilitation facility built near Loughborough. It will be built beside the Defence Medical Rehabilitation Centre, which opened in October 2018.

In 2021, the Global Disability Innovation (GDI Hub) at University College London became the first official Collaborating Centre for the World Health Organisation on Assistive Technology. The Centre leads key work on four research areas: humanitarian response, digital technology and artificial intelligence, service provision models, and the World Report on AT, published in 2022. More recently, the research areas are assistive and accessible technology, inclusive design, culture and participation, climate crisis resilience and inclusive educational technology. They lead the £40m

(£19.8m of funding with £20m matched funding) AT2030 programme, an assistive technology innovation programme funded by UK Aid. AT2030 brings organisations together to drive change, focusing on innovative products, new service models, and supporting global capacity.

In February 2022, ATech Policy Lab, a partnership between Policy Connect, Bournemouth University and the Ace Centre, was launched. It aims to design an evidence-based policy that makes technology enabling for everyone.

Motability, in January 2023, announced that it had awarded Coventry University in collaboration with RiDC (Research Institute for Disabled People), Designability, Connected Places Catapult, Policy Connect and WSP UK, with £20 million of grant funding to establish the UK's first Evidence Centre for Inclusive Transport. The Centre will research and develop solutions to make transport accessible for everyone.

Additionally, in the UK, there are multiple research centres dedicated to various clinical areas that specialise in assistive technology for specific medical conditions (such as: Centre for Biomechanics and Rehabilitation Technologies, Staffordshire University; Centre for Assistive Technology and Connected Healthcare, University of Sheffield; Centre for Health Sciences Research, University of Salford; National Centre for Prosthetics & Orthotics, Strathclyde University; Additive Manufacturing Research Group, Loughborough University; and Bioengineering Science Research Group, University of Southampton). Furthermore, there are research groups that focus on the design and manufacturing of assistive technology (such as: Assistive Technologies Innovation Centre, University of Wales; and Centre for Blast Injury Studies, Imperial College London;) and collaborations such as Transformative Innovation in the Delivery of Assisted Living products and services (TIDAL Network+), which is a collaboration between UCL, Strathclyde, Salford, and Loughborough Universities.

As outlined in this review, while data is not available to show a complete picture, there is a significant need for assistive technology across the population in England. Many public sector funding mechanisms are available to enable access to assistive technology. However, there are identified barriers to access which need to be addressed to improve access to AT.

9.8.10   Summary

Conducting a review of assistive technology is challenging due to the wide range of individuals who use it, the vast range of assistive products and services, the different sectors which provide it and the different departments it falls under within the government. A lack of data is also a significant challenge, with this being a global issue. To address this challenge the WHO is developing the Assistive Technology Assessment (ATA) toolkit to support countries in collecting data on assistive technology. The tools are the assistive technology capacity assessment (ATA-C), the rapid assistive technology assessment (rATA) and the assistive technology impact assessment tool (ATA-I) which are currently under development.

Assistive technology is used by a diverse range of people, making it difficult to estimate the number of users in England. However, global data indicates that over 2.5 billion people require assistive products, with this number expected to rise significantly as the population ages and noncommunicable diseases become more prevalent. Population surveys in 29 countries found that 10-69% of people reported needing assistive technology. Assistive technology is key to achieving the Sustainable Development Goals (SDGs) like universal healthcare, quality education, inclusive economic growth, and reducing inequality. AT empowers disabled people and promotes their social, economic, and political inclusion while making cities and public spaces more accessible for everyone. This review explored assistive technology in England, including who needs it, current usage,

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providers, and funders. It also covers challenges in access and recent research and development. With a focus on recent research and policy documents, it offers an evaluation of the state of assistive technology in England.

9.9 Appendix 4: BATA Assistive Product List

The British Assistive Technology Association (BATA) conducted the process to develop the first Assistive Products List Survey for the UK between 2020 and 2021.

The aim of the survey and subsequent consensus-building process was to 'enable those using and developing assistive technology (AT) to contribute to a list of the essential assistive products so that UK policymakers, users, and service providers can plan, procure and provide them even more effectively than we already do' [2].

Initially, 100 items were listed on the survey. These represented a broad selection of the many devices available and were taken from the model list from the WHO [1], which was used as a starting point for creating the first version of a UK-specific list.

This was complemented by ten consultation sessions with more than 25 stakeholder partners over 9 months from July 2020 to March 2021.

These sessions were batched into three rounds, which aimed to derive a focused list which could be used by policymakers.

A final consensus workshop was held on the 30th of March and attended by 37 people to review the list and discuss the recommendations and any relevant next steps.

The following table gives the proposed 100 Priority Assistive Products

MOBILITY	#	LIST
Crutches	1	Axillary crutches ISO 12.03.12
	2	Elbow crutches ISO 12.03.06
Walking sticks and canes	3	Walking sticks/canes ISO 12.03.03
	4	Tripod/Quadripod sticks ISO 12.03.16
Walkers	5	Walking frames ISO 12.06.03
	6	Rollators ISO 12.06.06
Wheelchairs	7	Manual wheelchairs – basic type for active users ISO 12.22.03
	8	Manual wheelchairs - push type
	9	Manual wheelchairs – intermediate/advanced type ISO 12.22.03
	10	Sports wheelchairs ISO 12.22.03
	11	Electrical wheelchairs ISO 12.23.06
	12	Electrical wheelchairs with postural support ISO 12.23.06

	13	Tricycles (three-wheeled cycles) ISO 12.18.09
Lower limb orthoses	14	Foot Orthoses (FO) ISO 06.12.03
	15	Footwear for diabetes/neuropathic foot ISO 06.12.03/09.03.42
	16	Orthopaedic shoes or footwear ISO 06.12.03/09.03.42
	17	Foot abduction braces/ Club foot braces/splints
	18	Ankle Foot Orthoses (calliper/brace) (AFO) ISO 06.12.06
	19	Knee orthoses (calliper/brace) (KO) ISO 06.12.09
	20	Knee ankle foot orthoses (calliper/brace) (KAFO) ISO 06.12.12
Upper limb orthoses	21	Hand splints (cock- up/wrist immobiliser) ISO 06.06.12
	22	Static wrist-hand orthoses (WHO) /splints ISO 06.06.12
	23	Shoulder slings
Spinal orthoses	24	Thoraco-lumbo-sacral orthoses ISO 06.03.09
	25	Cervical orthoses ISO 06.03.12
Lower limb prostheses	26	Below knee lower limb prosthesis ISO 06.24.09
	27	Above knee lower limb prosthesis ISO 06.24.15
Upper limb prostheses	28	Trans-humeral (above elbow) upper limb prosthesis ISO 06.18.15
	29	Trans-radial (below elbow) upper limb prosthesis ISO 06.18.09
Special devices for children with developmental delays	30	Adjustable walkers for children
	31	Table/seating frames
	32	Adjustable standing frames ISO 04.48.08
VISION	**#**	**LIST**
Spectacles	33	Spectacles for short distance/Reading glasses ISO 22.03.06
	34	Spectacles for long distance ISO 22.03.06

	35	Eyeglasses for low vision ISO 22.03.06
Magnifying devices	36	Magnifying glasses ISO 22.03.09
	37	Hand-held digital magnifiers ISO 22.03.18
	38	Pc Magnifiers
Tactile sticks	39	White canes (folding or non-folding) ISO 12.39.03
Interactive products	40	Refreshable braille displays ISO 22.39.05
	41	Text to speech software
	42	Screen readers ISO 22.39.12
	43	Screen Reader for Smart Phone/tablet
Products for writing	44	Portable braille note-takers ISO 22.12.21
	45	Braille Printers
	46	Braille writing equipment ISO 22.12.12
	47	Braille translation software ISO 22.39.12
	48	Automatic Speech Recognition software
Talking devices	49	Talking calculators ISO 22.15.06
	50	Talking/touching watches ISO 22.27.12
HEARING	**#**	**Notes**
Hearing aids	51	Body worn hearing aids ISO 22.06.06
	52	Behind the ear hearing aids ISO 22.06.15
	53	In the ear or in the canal hearing aids ISO 22.06.12
	54	Hearing aid rechargeable batteries and chargers
Communication products	55	Amplified telephones ISO 22.24.03
	56	Video communication devices
	57	Text to Text Communication Device
	58	Device/software for gesture to voice technologies
	59	DeafBlind Communicator (DBC)

Signalling products	60	Doorbell indicators ISO 22.27.03
	61	Fire and smoke alarm signallers ISO 22.27.09
	62	Vibrating multi-sound wrist bracelets ISO 22.27.09
Other products	63	Captioning TVs ISO 22.18.21
	64	Automatic speech recognition in captioning systems
COMMUNICATION	**#**	**LIST**
Non- electronic AAC	65	Communication boards/books ISO 22.21.03
	66	Communication cards ISO 22.21.03
Electronic AAC	67	Face-to-face communication software ISO 22.21.12
	68	Symbols generating software
	69	AAC apps
Accessories	70	Head mouse
	71	Head-mouth sticks ISO 24.18.15
	72	Keyboard and mouse emulation software ISO 22.36.18
COGNITION	**#**	**LIST** Primary / Supplementary
Multiple uses	73	Personal Digital Assistants (PDA) ISO 22.33.06
	74	Recorders (Dictaphone) ISO 22.18.08
Memory Aids	75	Watch with pre- programmed task reminders
	76	Pill organisers ISO 04.19.04
Time devices	77	Visual timers
	78	Time orientation products
	79	Time management products ISO 22.27.15
Locator devices	80	Portable GPS trackers ISO 22.27.24
	81	GPS locator watch/locator ISO 22.27.24
	82	Item locators

Navigation devices	83	Portable navigation aids ISO 12.39.06
	84	Portable travel aids ISO 12.39.06
Communication and language tools	85	Simplified mobile phones
	86	Word completion programs ISO 22.12.24
Picture based navigation software	87	Takes through pre-programmed daily-living tasks, step-by-step using pictures for each step.
Alarms	88	Personal emergency alarm systems ISO 22.27.18
	89	Fall detectors
	90	Medical Alert ID

ENVIRONMENT	#	LIST
Handrails and grab bars	91	Handrails and support rails ISO 18.18.03
	92	Grab bars and handgrips (fixed or removable) ISO 18.18.06 / 18.18.10
Assistive products for washing	93	Shower chairs ISO 09.33.03
	94	Bath/shower seats ISO 09.33.03
Assistive products for toileting	95	Toilet seat raisers ISO 09.12.15
	96	Commode chairs ISO 09.12.03
Beds	97	Pressure relief mattress ISO 04 33 06
Wheelchair accessories	98	Pressure relief cushions ISO 04.33.03
	99	Portable ramps ISO 18.30.15
	100	Sliding boards, sliding mats and turning sheets ISO 12.31.03

9.10 Table 5: AP access indicators by key demographics

Categories	Overall row totals	AP Need Total	AP Need Percent	AP Use Total	AP Use Percent	AP Unmet Need Total	AP Unmet Need Percent
Overall	7253	3288	45%	6313	87%	2217	31%
Age Group							
2-17	570	384	67%	493	87%	289	51%
18-64	4530	2009	44%	3775	83%	1422	31%
65+	2128	885	42%	2022	95%	495	23%
Gender							
Female	4058	1732	43%	3545	87%	1192	29%
Male	3120	1517	49%	2701	87%	989	32%
Non-binary, Intersex, or Other	59	33	56%	51	86%	26	44%
Ethnicity							
Asian	183	69	38%	146	80%	59	32%
Black	71	28	39%	51	72%	22	31%
Mixed	129	51	40%	104	81%	40	31%
Other	22	8	36%	16	73%	3	14%
White	6773	3091	46%	5979	88%	2060	30%
Social Grade							
Middle class	3582	1564	44%	3084	86%	1169	33%
Working class	3671	1724	47%	3229	88%	1048	29%
Region							
East Midlands	641	260	41%	569	89%	167	26%
East of England	636	265	42%	563	89%	174	27%
London	1181	696	59%	996	84%	508	43%

North East	398	194	49%	351	88%	112	28%
North West	949	459	48%	841	89%	290	31%
South East	1159	471	41%	1024	88%	337	29%
South West	838	342	41%	736	88%	220	26%
West Midlands	742	306	41%	613	83%	189	26%
Yorkshire Humberside	709	295	42%	620	87%	220	31%
Disability definition							
ONS	7240	3283	45%	6310	87%	2215	31%
IHS	6145	3128	51%	5495	89%	2048	33%
Self-identify	4073	2489	61%	3732	92%	1540	38%
WHO need	3288	3288	NA	3079	94%	1397	43%
Mobility Difficulty							
None	2698	556	21%	2079	77%	562	21%
Some	2845	1040	37%	2614	92%	876	31%
A lot	1486	1486	NA	1408	95%	680	46%
Cannot do	190	190	NA	185	97%	87	46%
Vision Difficulty							
None	3147	805	26%	2460	78%	671	21%
Some	2871	1270	44%	2701	94%	995	35%
A lot	1060	1060	NA	991	94%	473	45%
Cannot do	147	147	NA	141	96%	65	44%
Hearing Difficulty							
None	4602	1495	33%	3864	84%	1166	25%
Some	1706	861	51%	1587	93%	606	36%
A lot	786	786	NA	728	93%	376	48%
Cannot do	140	140	NA	119	85%	60	43%
Communication Difficulty							

None	5514	1934	35%	4787	87%	1375	25%
Some	1079	713	66%	943	87%	454	42%
A lot	534	534	NA	468	88%	314	59%
Cannot do	100	100	NA	98	98%	61	61%
Remembering Difficulty							
None	3650	953	26%	3031	83%	762	21%
Some	2417	1169	48%	2200	91%	839	35%
A lot	1024	1024	NA	930	91%	539	53%
Cannot do	129	129	NA	126	98%	62	48%
Self-care Difficulty							
None	3832	874	23%	3204	84%	751	20%
Some	2106	1121	53%	1927	92%	767	36%
A lot	1107	1107	NA	1008	91%	599	54%
Cannot do	165	165	NA	142	86%	88	53%
AP use							
Mobility	3561	2199	62%	3561	NA	1401	39%
Vision	5494	2711	49%	5494	NA	1816	33%
Hearing	2002	1307	65%	2002	NA	783	39%
Communication	1715	1094	64%	1715	NA	714	42%
Remembering	3127	1860	60%	3127	NA	1236	40%
Self-care	3112	2018	65%	3112	NA	1260	41%
AP unmet need							
Mobility	1243	943	76%	1162	94%	1243	NA
Vision	683	375	55%	655	96%	683	NA
Hearing	324	209	65%	309	95%	324	NA
Communication	195	127	65%	172	88%	195	NA
Remembering	479	321	67%	449	94%	479	NA
Self-care	685	477	70%	639	93%	685	NA

9.11 Table 6: AP use by key demographics

Categories	Overall row totals	Mobility total	Mobility percent	Vision total	Vision percent	Hearing total	Hearing percent	Communication total	Communication percent	Remembering total	Remembering percent	Self-care total	Self-care percent
Overall	7253	3561	49%	5494	76%	2002	28%	1715	24%	3127	43%	3112	43%
Age Group													
2-17	570	421	74%	448	79%	415	73%	420	74%	428	75%	413	73%
18-64	4530	2029	45%	3173	70%	920	20%	1024	23%	2024	45%	1723	38%
65+	2128	1088	51%	1850	87%	644	30%	248	12%	653	31%	954	45%
Gender													
Female	4058	1827	45%	3007	74%	717	18%	624	15%	1650	41%	1652	41%
Male	3120	1707	55%	2431	78%	1260	40%	1071	34%	1439	46%	1441	46%
Non-binary, Intersex, or Other	59	16	27%	42	71%	18	31%	16	27%	30	51%	9	15%
Ethnicity													
Asian	183	68	37%	121	66%	50	27%	51	28%	74	40%	63	34%
Black	71	20	28%	41	58%	8	11%	21	30%	24	34%	24	34%
Mixed	129	59	46%	90	70%	33	26%	35	27%	56	43%	40	31%

Other	22	8	36%	16	73%	3	14%	2	9%	6	27%	6	27%
White	6773	3396	50%	5210	77%	1904	28%	1602	24%	2961	44%	2970	44%
Social Grade													
Middle class	3582	1821	51%	2749	77%	1286	36%	1062	30%	1625	45%	1592	44%
Working class	3671	1740	47%	2745	75%	716	20%	653	18%	1502	41%	1520	41%
Region													
East Midlands	641	300	47%	484	76%	149	23%	109	17%	245	38%	245	38%
East of England	636	316	50%	475	75%	125	20%	95	15%	243	38%	255	40%
London	1181	805	68%	923	78%	704	60%	707	60%	789	67%	750	64%
North East	398	180	45%	297	75%	101	25%	77	19%	157	39%	154	39%
North West	949	475	50%	727	77%	223	24%	156	16%	397	42%	388	41%
South East	1159	481	42%	888	77%	258	22%	206	18%	438	38%	450	39%
South West	838	385	46%	642	77%	165	20%	99	12%	311	37%	305	36%
West Midlands	742	312	42%	529	71%	144	19%	134	18%	268	36%	271	37%
Yorkshire Humberside	709	307	43%	529	75%	133	19%	132	19%	279	39%	294	42%
Disability definition													
ONS	7240	3558	49%	5493	76%	2001	28%	1713	24%	3125	43%	3111	43%

IHS	6145	3385	55%	4770	78%	1921	31%	1633	27%	2952	48%	2972	48%
Self-identify	4073	2756	68%	3215	79%	1416	35%	1272	31%	2212	54%	2434	60%
WHO need	3288	2199	67%	2711	83%	1307	40%	1094	33%	1860	57%	2018	61%

9.12 Table 7: AP unmet need by key demographics

Categories	Overall row totals	Mobility total	Mobility percent	Vision total	Vision percent	Hearing total	Hearing percent	Communication total	Communication percent	Remembering total	Remembering percent	Self-care total	Self-care percent
Overall	7253	1243	17%	683	9%	324	4%	195	3%	479	7%	685	9%
Age Group													
2-17	570	264	46%	19	3%	11	2%	12	2%	13	2%	25	4%
18-64	4530	781	17%	467	10%	192	4%	166	4%	387	9%	484	11%
65+	2128	190	9%	197	9%	120	6%	17	1%	77	4%	175	8%
Gender													
Female	4058	564	14%	414	10%	174	4%	114	3%	333	8%	469	12%
Male	3120	660	21%	255	8%	142	5%	71	2%	136	4%	207	7%
Non-binary, Intersex, or Other	59	12	20%	8	14%	4	7%	6	10%	6	10%	5	9%
Ethnicity													
Asian	183	28	15%	27	15%	15	8%	13	7%	22	12%	26	14%
Black	71	13	18%	9	13%	3	4%	3	4%	8	11%	11	16%
Mixed	129	19	15%	14	11%	3	2%	3	2%	11	9%	7	5%
Other	22	2	9%	2	9%	1	5%	0	0%	2	9%	2	9%

White	6773	1149	17%	615	9%	300	4%	162	2%	433	6%	625	9%

Social Grade

Middle class	3582	713	20%	285	8%	142	4%	76	2%	174	5%	289	8%
Working class	3671	530	14%	398	11%	182	5%	119	3%	305	8%	396	11%

Region

East Midlands	641	79	12%	64	10%	29	5%	14	2%	42	7%	54	8%
East of England	636	82	13%	63	10%	32	5%	20	3%	41	6%	61	10%
London	1181	438	37%	54	5%	17	1%	27	2%	40	3%	62	5%
North East	398	50	13%	40	10%	17	4%	14	4%	32	8%	41	10%
North West	949	131	14%	99	10%	54	6%	25	3%	84	9%	115	12%
South East	1159	157	14%	120	10%	61	5%	28	2%	86	7%	116	10%
South West	838	109	13%	83	10%	35	4%	19	2%	49	6%	82	10%
West Midlands	742	93	13%	83	11%	42	6%	26	4%	47	6%	70	9%
Yorkshire Humberside	709	104	15%	77	11%	37	5%	22	3%	58	8%	84	12%

Disability definition												
ONS	7240	1241	17%	682	9%	323	5%	194	3%	478	7%	684	9%
IHS	6145	1211	20%	615	10%	309	5%	188	3%	458	8%	658	11%
Self-identify	4073	1018	25%	404	10%	210	5%	140	3%	364	9%	549	14%
WHO need	3288	943	29%	375	11%	209	6%	127	4%	321	10%	477	15%

9.13 Table 8: Barriers by key demographics

Categories	Overall row totals	Not available' total	Not available' percent	Not suitable' total	Not suitable' percent	Lack of transport/too far' total	Lack of transport/too far' percent	Lack of time' total	Lack of time' percent	Lack of support' total	Lack of support' percent	Cannot afford' total	Cannot afford' percent	Stigma/shyness' total	Stigma/shyness' percent	Do not know about APs' total	Do not know about APs' percent	Other total	Other percent
Overall	2217	227	10%	220	10%	199	9%	263	12%	417	19%	998	45%	373	17%	215	10%	215	10%
Age Group																			
2-17	289	84	29%	63	22%	61	21%	74	26%	76	26%	99	34%	75	26%	6	2%	4	1%
18-64	1422	117	8%	126	9%	112	8%	162	11%	288	20%	717	50%	250	18%	146	10%	104	7%
65+	495	24	5%	29	6%	23	5%	24	5%	50	10%	181	37%	45	9%	63	13%	147	30%
Gender																			
Female	1192	79	7%	79	7%	56	5%	79	7%	203	17%	626	53%	194	16%	138	12%	154	13%
Male	989	145	15%	138	14%	140	14%	178	18%	205	21%	354	36%	169	17%	75	8%	99	10%
Non-binary, Intersex, or Other	26	3	12%	1	4%	1	4%	5	19%	7	27%	14	54%	8	31%	2	8%	1	4%
Ethnicity																			
Asian	59	5	9%	12	20%	6	10%	12	20%	6	10%	17	29%	10	17%	9	15%	2	3%
Black	22	3	14%	3	14%	2	9%	3	14%	1	5%	10	46%	4	18%	2	9%	1	5%

	Total		%		%		%		%		%		%		%		%		%
Mixed	40	3	8%	3	8%	5	13%	4	10%	5	13%	19	48%	7	18%	6	15%	3	8%
Other	3	1	33%	1	33%	0	0%	0	0%	0	0%	0	0%	0	0%	1	33%	0	0%
White	2060	215	10%	200	10%	184	9%	230	11%	404	20%	936	45%	350	17%	197	10%	249	12%
Social Grade																			
Middle class	1169	166	14%	149	13%	146	13%	204	18%	221	19%	438	38%	211	18%	97	8%	138	12%
Working class	1048	61	6%	71	7%	53	5%	59	6%	196	19%	560	53%	162	16%	118	11%	117	11%
Region																			
East Midlands	167	9	5%	10	6%	11	7%	16	10%	33	20%	85	51%	26	16%	18	11%	21	13%
East of England	174	6	3%	18	10%	6	3%	13	8%	26	15%	85	49%	18	10%	20	12%	25	14%
London	508	117	23%	104	21%	97	19%	124	24%	121	24%	173	34%	108	21%	18	4%	12	2%
North East	112	6	5%	10	9%	5	5%	9	8%	18	16%	50	45%	15	13%	12	11%	19	17%
North West	290	24	8%	24	8%	19	7%	20	7%	58	20%	135	47%	56	19%	32	11%	38	13%
South East	337	15	5%	22	7%	27	8%	47	14%	61	18%	164	49%	58	17%	30	9%	48	14%
South West	220	18	8%	9	4%	8	4%	9	4%	42	19%	112	51%	36	16%	30	14%	31	14%
West Midlands	189	14	7%	11	6%	14	7%	9	5%	28	15%	90	48%	29	15%	23	12%	28	15%
Yorkshire Humberside	220	18	8%	12	6%	12	6%	16	7%	30	14%	104	47%	27	12%	32	15%	33	15%

Disability definition

ONS	2215	227	10%	220	10%	198	9%	263	12%	416	19%	997	45%	373	17%	214	10%	255	12%
IHS	2048	220	11%	198	10%	198	10%	243	12%	407	20%	962	47%	365	18%	165	8%	230	11%
Self-identify	1540	182	12%	147	10%	160	10%	173	11%	332	22%	772	50%	287	19%	107	7%	154	10%
WHO need	1397	177	13%	148	11%	162	12%	154	11%	327	23%	697	50%	266	19%	96	7%	128	9%

Mobility Difficulty

None	562	49	9%	67	12%	35	6%	94	17%	61	11%	196	35%	79	14%	80	14%	59	11%
Some	876	91	10%	80	9%	77	9%	107	12%	158	18%	381	44%	163	19%	90	10%	119	14%
A lot	680	70	10%	60	9%	76	11%	50	7%	168	25%	370	54%	111	16%	37	5%	69	10%
Cannot do	87	16	18%	12	14%	9	10%	10	12%	28	32%	48	55%	20	23%	5	6%	8	9%

Vision Difficulty

None	671	46	7%	57	9%	21	3%	54	8%	104	16%	283	42%	97	15%	94	14%	103	15%
Some	995	98	10%	94	9%	95	10%	133	13%	183	18%	475	48%	164	17%	76	8%	111	11%
A lot	473	74	16%	64	14%	73	15%	63	13%	116	25%	204	43%	89	19%	34	7%	35	7%
Cannot do	65	9	14%	5	8%	10	15%	10	15%	13	20%	34	52%	21	32%	5	8%	4	6%

Hearing Difficulty

None	1166	69	6%	82	7%	55	5%	103	9%	181	16%	551	47%	167	14%	139	12%	160	14%
Some	606	62	10%	70	12%	59	10%	65	11%	123	20%	290	48%	102	17%	48	8%	75	12%
A lot	376	86	23%	60	16%	67	18%	81	22%	97	26%	128	34%	89	24%	23	6%	15	4%
Cannot do	60	9	15%	6	10%	16	27%	13	22%	16	27%	28	47%	14	23%	1	2%	4	7%

Communication Difficulty

None	1375	82	6%	96	7%	69	5%	117	9%	195	14%	638	46%	177	13%	161	12%	222	16%
Some	454	54	12%	51	11%	42	9%	51	11%	117	26%	218	48%	100	22%	37	8%	28	6%
A lot	314	82	26%	63	20%	69	22%	72	23%	85	27%	114	36%	77	25%	11	4%	3	1%
Cannot do	61	8	13%	9	15%	18	30%	21	34%	19	31%	27	44%	16	26%	1	2%	2	3%

Remembering Difficulty

None	762	41	5%	76	10%	32	4%	88	12%	67	9%	286	38%	71	9%	108	14%	135	18%
Some	839	87	10%	58	7%	64	8%	72	9%	182	22%	418	50%	154	18%	75	9%	102	12%
A lot	539	88	16%	76	14%	81	15%	82	15%	150	28%	258	48%	131	24%	25	5%	18	3%
Cannot do	62	11	18%	7	11%	20	32%	19	31%	14	23%	32	52%	14	23%	3	5%	0	0%

Self-care Difficulty

None	751	43	6%	69	9%	29	4%	92	12%	71	10%	271	36%	83	11%	125	17%	131	17%
Some	767	54	7%	61	8%	58	8%	69	9%	161	21%	381	50%	136	18%	66	9%	93	12%
A lot	599	111	19%	80	13%	85	14%	82	14%	163	27%	300	50%	136	23%	18	3%	29	5%
Cannot do	88	19	22%	9	10%	26	30%	18	21%	21	24%	44	50%	15	17%	2	2%	0	0%

AP use

Mobility	1401	168	12%	145	10%	165	12%	153	11%	325	23%	678	48%	260	19%	86	6%	155	11%
Vision	1816	189	10%	180	10%	183	10%	217	12%	352	19%	849	47%	327	18%	151	8%	213	12%
Hearing	783	128	16%	117	15%	125	16%	135	17%	201	26%	318	41%	170	22%	45	6%	56	7%

Communication	714	126	18%	109	15%	125	18%	125	18%	192	27%	311	44%	170	24%	24	3%	32	5%
Remembering	1236	159	13%	130	11%	156	13%	156	13%	295	24%	623	50%	264	21%	67	5%	102	8%
Self-care	1260	161	13%	131	10%	164	13%	142	11%	296	24%	618	49%	246	20%	69	6%	136	11%
AP unmet need																			
Mobility	1243	176	14%	145	12%	172	14%	174	14%	317	26%	608	49%	262	21%	54	4%	92	7%
Vision	683	35	5%	42	6%	55	8%	85	12%	108	16%	364	53%	112	16%	59	9%	80	12%
Hearing	324	29	9%	24	7%	35	11%	36	11%	74	23%	151	47%	54	17%	32	10%	46	14%
Communication	195	15	8%	9	5%	21	11%	30	15%	57	29%	108	55%	38	20%	13	7%	12	6%
Remembering	479	35	7%	23	5%	41	9%	44	9%	121	25%	286	60%	109	23%	45	9%	35	7%
Self-care	685	49	7%	33	5%	59	9%	59	9%	173	25%	374	55%	129	19%	58	9%	78	11%

9.14 Table 9: Device use and unmet need

ID #	AP Type	Use total	Use percent	Unmet need total	Unmet need percent
206	spectacles	4625	64%	529	7%
602	grab-bars/hand rails	1924	27%	320	4%
501	pill organisers	1715	24%	260	4%
102	canes/sticks	1502	21%	289	4%
401	smart phones/PDAs for communication support	1118	15%	111	2%
601	chairs for shower/bath/toilet	1076	15%	315	4%
302	hearing aids	1074	15%	213	3%
603	incontinence products	1070	15%	173	2%
101	elbow crutches	1060	15%	166	2%
502	smart phones/PDAs for memory/cognition support	1037	14%	102	1%
205	optical magnifiers	971	13%	80	1%
506	time management products	753	10%	99	1%
187	other (mobility)	598	8%	NA	NA
117	therapeutic footwear	518	7%	106	1%
111	pressure relief cushions	514	7%	323	4%
209	smart phones/PDAs for vision support	499	7%	52	1%
403	communication software	420	6%	39	1%
108	upper limb orthoses	418	6%	130	2%
304	smart phones/PDAs for hearing support	406	6%	50	1%
504	personal emergency alarm systems	390	5%	92	1%

115	rollators	359	5%	47	1%
606	screen readers	358	5%	42	1%
507	travel aids	354	5%	72	1%
301	alarm signallers	353	5%	37	1%
404	recorders	333	5%	31	0%
303	closed captioning displays	325	4%	37	1%
104	manual wheelchair	318	4%	191	3%
503	GPS	315	4%	33	0%
207	watches	308	4%	46	1%
505	simplified mobile phones	272	4%	29	0%
306	hearing loops	266	4%	26	0%
204	digital magnifiers	264	4%	71	1%
402	communication boards/books/cards	256	4%	45	1%
604	portable ramps	243	3%	92	1%
112	pressure relief mattresses	234	3%	176	2%
106	manual push wheelchair	209	3%	150	2%
201	audio player	198	3%	11	0%
107	electric wheelchair	196	3%	252	3%
203	braille writers	193	3%	9	0%
116	walking frames	169	2%	59	1%
605	keyboard/mouse software	158	2%	30	0%
307	video communication devices	158	2%	14	0%
687	other (self-care)	155	2%	NA	NA
211	gesture to voice technology	144	2%	12	0%
118	fall detectors	140	2%	75	1%

109	lower limb orthoses	125	2%	51	1%
208	white canes	123	2%	14	0%
202	braille displays	107	1%	12	0%
305	deaf/blind communicators for hearing support	105	1%	12	0%
210	deaf/blind communicators	91	1%	6	0%
103	club foot brace	81	1%	193	3%
105	manual postural wheelchair	78	1%	169	2%
287	other (vision)	76	1%	NA	NA
487	other (communication)	63	1%	NA	NA
587	other (remembering)	57	1%	NA	NA
387	other (hearing)	57	1%	0	0%
110	spinal orthoses	48	1%	39	1%
119	standing frames	31	0%	28	0%
113	lower limb prostheses	26	0%	9	0%
114	upper limb prostheses	12	0%	6	0%
120	tricycles	6	0%	23	0%

9.15 Table 10: AP Payers

ID #	Categories	Overall row totals	Government' total	Government' percent	NGO/ Charity' total	NGO/ Charity percent'	Employer/ school' total	Employer/ school percent'	Insurance' total	Insurance' percent	Out of pocket (self)' total	Out of pocket (self)' percent	Friends/ family' total	Friends/ family' percent	Don't know' total	Don't know' percent	Other' total	Other percent
ID #	Overall	12961	3130	24%	574	4%	628	5%	551	4%	7770	60%	1046	8%	384	3%	302	2%
0	other	660	170	26%	12	2%	6	1%	9	1%	369	56%	64	10%	29	4%	25	4%
101	elbow crutches	517	324	63%	38	7%	35	7%	22	4%	111	22%	27	5%	7	1%	22	4%
102	canes/ sticks	966	200	21%	24	3%	28	3%	22	2%	644	67%	105	11%	26	3%	17	2%
103	club foot brace	20	0	0%	11	55%	9	45%	8	40%	9	45%	1	5%	1	5%	1	5%
104	manual wheelchair	128	51	40%	10	8%	9	7%	10	8%	53	41%	12	9%	3	2%	4	3%
105	manual postural wheelchair	20	4	20%	4	20%	4	20%	4	20%	6	30%	2	10%	1	5%	1	5%
106	manual push	92	32	35%	3	3%	2	2%	1	1%	41	45%	15	16%	2	2%	1	1%

	wheelchair																
107	electric wheelchair	143	37	26%	10	7%	4	3%	2	1%	82	57%	19	13%	5	4%	1	1%
108	upper limb orthoses	111	38	34%	3	3%	5	5%	7	6%	62	56%	6	5%	3	3%	2	2%
109	lower limb orthoses	64	32	50%	1	2%	2	3%	2	3%	26	41%	7	11%	1	2%	0	0%
110	spinal orthoses	19	9	47%	1	5%	1	5%	0	0%	6	32%	1	5%	0	0%	2	11%
111	pressure relief cushions	201	30	15%	2	1%	6	3%	3	2%	142	71%	26	13%	5	3%	3	2%
112	pressure relief mattresses	109	21	19%	5	5%	3	3%	3	3%	69	63%	15	14%	2	2%	1	1%
113	lower limb prostheses	8	6	75%	0	0%	1	13%	1	13%	1	13%	1	13%	0	0%	0	0%
114	upper limb	4	2	50%	1	25%	0	0%	1	25%	1	25%	0	0%	0	0%	0	0%

	prostheses																
115	rollators	160	41	26%	3	2%	1	1%	1	1%	96	60%	16	10%	6	4%	2	1%
116	walking frames	57	32	56%	4	7%	0	0%	1	2%	15	26%	4	7%	1	2%	4	7%
117	therapeutic footwear	219	94	43%	4	2%	6	3%	7	3%	109	50%	8	4%	10	5%	1	1%
118	fall detectors	41	17	42%	2	5%	1	2%	1	2%	19	46%	3	7%	0	0%	0	0%
119	standing frames	2	1	50%	0	0%	0	0%	0	0%	1	50%	0	0%	0	0%	0	0%
201	audio player	42	15	36%	9	21%	15	36%	22	52%	7	17%	6	14%	0	0%	0	0%
202	braille displays	45	9	20%	11	24%	18	40%	15	33%	14	31%	8	18%	0	0%	0	0%
203	braille writers	59	14	24%	19	32%	22	37%	14	24%	20	34%	6	10%	0	0%	0	0%
204	digital magnifiers	52	6	12%	4	8%	8	15%	2	4%	27	52%	6	12%	3	6%	1	2%
205	optical magnifiers	277	24	9%	12	4%	17	6%	14	5%	193	70%	37	13%	10	4%	3	1%
206	spectacles	3717	636	17%	36	1%	66	2%	49	1%	2892	78%	148	4%	77	2%	47	1%

207	watches	91	18	20%	23	25%	29	32%	15	17%	30	33%	16	18%	0	0%	0	0%
208	white canes	54	14	26%	20	37%	10	19%	10	19%	12	22%	4	7%	2	4%	1	2%
209	smart phones/ PDAs for vision	166	18	11%	10	6%	21	13%	14	8%	102	61%	19	11%	3	2%	9	5%
210	deaf/blind communicators (vision)	23	5	22%	6	26%	13	57%	10	44%	5	22%	3	13%	0	0%	0	0%
211	gesture to voice technology	37	14	38%	6	16%	12	32%	13	35%	11	30%	6	16%	1	3%	0	0%
301	alarm signallers	84	20	24%	19	23%	35	42%	29	35%	25	30%	10	12%	1	1%	2	2%
302	hearing aids	665	442	67%	21	3%	17	3%	27	4%	175	26%	21	3%	12	2%	7	1%
303	closed captioning displays	120	12	10%	6	5%	9	8%	7	6%	33	28%	8	7%	25	21%	36	30%
304	smart phones/ PDAs	116	13	11%	19	16%	27	23%	28	24%	47	41%	29	25%	3	3%	4	3%

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	for hearing																
305	deaf/blind communicators (hearing)	17	2	12%	5	29%	9	53%	6	35%	6	35%	4	24%	0	0%	0	0%
306	hearing loops	77	16	21%	24	31%	15	20%	20	26%	34	44%	3	4%	1	1%	2	3%
307	video communication devices	32	3	9%	8	25%	12	38%	8	25%	10	31%	6	19%	0	0%	0	0%
401	smart phones/ PDAs for communication support	384	24	6%	29	8%	25	7%	36	9%	223	58%	93	24%	6	2%	10	3%
402	communication boards/ books/cards	47	7	15%	11	23%	15	32%	11	23%	11	23%	11	23%	1	2%	2	4%
403	communication software	69	15	22%	16	23%	24	35%	20	29%	28	41%	6	9%	1	1%	1	1%
404	recorders	53	9	17%	11	21%	17	32%	12	23%	17	32%	4	8%	1	2%	2	4%

501	pill organisers	834	52	6%	11	1%	4	1%	9	1%	681	82%	67	8%	28	3%	9	1%
502	smart phones/ PDAs for memory	313	7	2%	10	3%	15	5%	17	5%	237	76%	47	15%	9	3%	5	2%
503	GPS	38	5	13%	3	8%	3	8%	6	16%	20	53%	7	18%	1	3%	1	3%
504	personal emergency alarm systems	63	14	22%	8	13%	4	6%	7	11%	28	44%	4	6%	2	3%	2	3%
505	simplified mobile phones	55	0	0%	5	9%	11	20%	8	15%	30	55%	8	15%	3	6%	0	0%
506	time management products	235	10	4%	6	3%	15	6%	3	1%	186	79%	31	13%	4	2%	4	2%
507	travel aids	35	3	9%	2	6%	5	14%	4	11%	20	57%	6	17%	2	6%	0	0%
601	chairs for shower/ bath/toilet	371	174	47%	21	6%	2	1%	2	1%	133	36%	20	5%	15	4%	13	4%

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602	grab-bars/hand rails	775	316	41%	39	5%	4	1%	2	0%	290	37%	51	7%	58	8%	44	6%
603	incontinence products	423	58	14%	3	1%	0	0%	2	1%	343	81%	13	3%	12	3%	3	1%
604	portable ramps	17	6	35%	1	6%	1	6%	1	6%	8	47%	0	0%	0	0%	2	12%
605	keyboard/ mouse software	8	4	50%	0	0%	1	13%	0	0%	3	38%	2	25%	0	0%	0	0%
606	screen readers	26	4	15%	2	8%	4	15%	3	12%	7	27%	4	15%	1	4%	5	19%

9.16 Table 11: AP Sources

Categories	Overall row totals	Government/ Public facility' total	Government/ Public facility' percent	NGO/ non-profit facility' total	NGO/ non-profit facility' percent	Private sector facility/store' total	Private sector facility/ store' percent	Friends/ family' total	Friends/ family' percent	I made it myself' total	I made it myself' percent	Other' total	Other' percent	Don't know' total	Don't know' percent
Overall	12961	3215	25%	840	6%	7554	58%	1234	10%	421	3%	756	6%	214	2%
other	660	183	28%	25	4%	327	50%	71	11%	11	2%	57	9%	12	2%
elbow crutches	517	344	67%	34	7%	126	24%	34	7%	5	1%	6	1%	3	1%
canes /sticks	966	255	26%	52	5%	544	56%	140	15%	20	2%	78	8%	7	1%
club foot brace	20	3	15%	14	70%	10	50%	6	30%	1	5%	0	0%	0	0%
manual wheelchair	128	58	45%	16	13%	52	41%	17	13%	3	2%	4	3%	0	0%
manual postural wheelchair	20	7	35%	6	30%	11	55%	5	25%	1	5%	0	0%	0	0%
manual push wheelchair	92	36	39%	7	8%	33	36%	13	14%	5	5%	4	4%	0	0%
electric wheelchair	143	33	23%	13	9%	77	54%	17	12%	4	3%	9	6%	0	0%
upper limb orthoses	111	46	41%	3	3%	59	53%	10	9%	2	2%	9	8%	1	1%
lower limb orthoses	64	36	56%	3	5%	24	38%	7	11%	1	2%	0	0%	0	0%

spinal orthoses	19	12	63%	1	5%	6	32%	1	5%	0	0%	0	0%	1	5%
pressure relief cushions	201	39	19%	7	4%	119	59%	29	14%	10	5%	10	5%	1	1%
pressure relief mattresses	109	22	20%	9	8%	67	62%	9	8%	2	2%	6	6%	1	1%
lower limb prostheses	8	6	75%	0	0%	2	25%	1	13%	0	0%	0	0%	0	0%
upper limb prostheses	4	2	50%	1	25%	1	25%	1	25%	0	0%	0	0%	0	0%
rollators	160	38	24%	6	4%	93	58%	13	8%	2	1%	9	6%	3	2%
walking frames	57	37	65%	2	4%	14	25%	6	11%	0	0%	1	2%	1	2%
therapeutic footwear	219	98	45%	13	6%	104	48%	13	6%	0	0%	12	6%	2	1%
fall detectors	41	17	42%	4	10%	17	42%	5	12%	0	0%	1	2%	0	0%
standing frames	2	2	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
audio player	42	11	26%	21	50%	24	57%	10	24%	1	2%	0	0%	1	2%
braille displays	45	7	16%	24	53%	28	62%	14	31%	5	11%	0	0%	0	0%
braille writers	59	15	25%	28	48%	29	49%	18	31%	8	14%	1	2%	0	0%
digital magnifiers	52	12	23%	7	14%	28	54%	10	19%	3	6%	4	8%	1	2%
optical magnifiers	277	28	10%	17	6%	170	61%	44	16%	5	2%	29	11%	7	3%
spectacles	3717	437	12%	59	2%	3043	82%	73	2%	27	1%	152	4%	64	2%
watches	91	18	20%	35	39%	35	39%	31	34%	4	4%	2	2%	1	1%
white canes	54	18	33%	17	32%	24	44%	7	13%	4	7%	1	2%	1	2%

smart phones/PD As for vision	166	21	13%	23	14%	89	54%	35	21%	13	8%	5	3%	8	5%
deaf/blind communicators (vision)	23	3	13%	12	52%	11	48%	7	30%	0	0%	0	0%	0	0%
gesture to voice technology	37	13	35%	10	27%	20	54%	16	43%	1	3%	0	0%	0	0%
alarm signallers	84	26	31%	25	30%	45	54%	17	20%	3	4%	1	1%	4	5%
hearing aids	665	405	61%	27	4%	238	36%	24	4%	8	1%	5	1%	3	1%
closed captioning displays	120	12	10%	13	11%	24	20%	10	8%	9	8%	47	39%	19	16%
smart phones/PD As for hearing	116	21	18%	39	34%	48	41%	40	35%	14	12%	5	4%	2	2%
deaf/blind communicators (hearing)	17	5	29%	6	35%	10	59%	7	41%	4	24%	0	0%	0	0%
hearing loops	77	21	27%	27	35%	31	40%	18	23%	6	8%	2	3%	3	4%
video communication devices	32	4	13%	12	38%	17	53%	13	41%	3	9%	0	0%	0	0%
smart phones/PD As for communication	384	42	11%	34	9%	197	51%	100	26%	43	11%	34	9%	13	3%

communication boards/books/cards	47	10	21%	13	28%	21	45%	17	36%	3	6%	0	0%	1	2%
communication software	69	24	35%	16	23%	29	42%	27	39%	12	17%	0	0%	1	1%
recorders	53	14	26%	15	28%	17	32%	14	26%	7	13%	1	2%	2	4%
pill organisers	834	66	8%	14	2%	590	71%	61	7%	33	4%	90	11%	7	1%
smart phones/PDAs for memory	313	13	4%	19	6%	179	57%	50	16%	29	9%	33	11%	10	3%
GPS	38	7	18%	8	21%	21	55%	9	24%	6	16%	0	0%	0	0%
personal emergency alarm systems	63	24	38%	12	19%	23	37%	7	11%	3	5%	2	3%	0	0%
simplified mobile phones	55	3	6%	4	7%	30	55%	7	13%	7	13%	5	9%	3	6%
time management products	235	12	5%	12	5%	130	55%	46	20%	46	20%	14	6%	4	2%
travel aids	35	4	11%	4	11%	19	54%	10	29%	2	6%	3	9%	0	0%
chairs for shower/bath/toilet	371	193	52%	21	6%	127	34%	22	6%	5	1%	17	5%	2	1%
grab-bars/hand rails	775	377	49%	36	5%	245	32%	55	7%	21	3%	59	8%	17	2%
incontinence products	423	59	14%	8	2%	308	73%	11	3%	14	3%	35	8%	1	0%

portable ramps	17	7	41%	2	12%	6	35%	1	6%	1	6%	0	0%	1	6%
keyboard/ mouse software	8	2	25%	2	25%	4	50%	1	13%	2	25%	1	13%	0	0%
screen readers	26	7	27%	2	8%	8	31%	4	15%	2	8%	2	8%	6	23%