Global report on assistive technology[1]

Section 3
Identifying barriers to assistive technology

Key messages

There are many barriers to accessing assistive technology, including:

- **Lack of awareness** often drives low uptake, compounded by an absence of information on the types and availability of assistive products.
- **High costs** due to over-priced assistive products and associated service delivery cost is one of the most common barriers.
- **Limited physical and geographical access** puts assistive technology out of reach for many potential users.
- **Inadequate product range, quantity, quality and suitability** can make assistive products unavailable, unsafe, ineffective and even abandoned.
- **Procurement and delivery challenges** delay and reduce access.
- **Capacity gaps exist in the assistive technology workforce** with shortage of workforce with adequate knowledge on assistive technology and lack of trained personnel at all levels of health and social care.
- **Low policy profile and lack of legislation** lead to the low prioritization of assistive technology, and legislation that fails to cover people with all types of functional difficulty.
- **Lack of funding and investment** for the strengthening of national assistive technology systems exists in many countries, alongside disparities in funding levels by programmes, including insurance systems, and geographical areas within countries.
- **Fragmentation of the assistive technology sector**, including between professions, user groups, funding and provision mechanisms, and multiple access pathways characterize the sector.
- **Sociodemographic barriers** hinder equitable universal access to assistive technology.

[1]

Assistive technology should be – like all aspects of a health service – available and accessible equally to all, regardless of gender, socioeconomic status or geographic location. As shown in Section 2[2], the real access scenario is often, however, far from this ideal.

Limited services

Lack of awareness and information

Poor understanding of assistive technology often drives low uptake, compounded by an absence of trustworthy information on the types and availability of assistive technology and possible solutions *(133)*. Beliefs, misconceptions and stigma can also discourage and prevent users and their families from finding out how to obtain needed assistive products *(134)*.

While there may be awareness of more commonly available assistive products such as wheelchairs, hearing aids and spectacles, potential users and providers may not be familiar with a wide range of assistive products for communication, cognition, or self-care that could make significant improvements in the lives of people in need. Poor literacy, lack of Internet access, inaccessible or untrustworthy information pose further barriers to becoming aware of the need for and benefits of using assistive technology *(28)*.

Information about product costs and how to gain access to assistive technology tends to be fragmented across several public institutions (e.g. health, social welfare and education), and private or NGO providers. Without a centralized and accessible assistive technology information source, the burden of finding basic information (e.g. how do I get a pair of affordable crutches that suit my size and living environment?) is placed on the user and their support networks.

Lack of services

Many assistive products require pre- and post- purchase services involving trained personnel – services that should be integrated into health, education or social services rather than being linked to the standalone purchase of a product from a local shop. To ensure that assistive products are fit for purpose, WHO recommends four types of provision services: assessment, fitting, user training and follow up *(135)*. Benefits and safety may be compromised by weakness in any of these steps. When product options and related services are inadequate or not available close enough to where the potential user lives, more time and financial resources are needed to reach assistive technology providers. Discrimination has been identified as a common experience for people with disabilities when accessing the health system. A negative experience with health care or other providers can discourage users from accessing assistive products and related support *(136)*.

Lack of early identification – such as universal hearing or eye screening – results in unmet assistive technology needs. For those able to access assistive technology, the quality of products and services available depend on the presence of trained personnel, service standards, delivery time, number of visits required and procurement of safe and effective products.

[2] See: "Disability – issues, problems, solutions", No. III-VI/2022(44-45), pp. 44-68

The amount and nature of services provided are determined by training and practice standards and resources available to ensure those standards can be met. For instance, personnel working within the public health system may be trained in all four services (i.e. assessment, fitting, user training and follow up) but follow-up services are not funded. Thus, even when users receive a product that meets their needs, inadequate follow-up services can reduce long-term usability and lead to abandonment. The lack of planning and funding for follow-up services such as maintenance, repairs and spare parts can be a barrier to sustained use of assistive products. Deficits in service provision were observed in the current systems, as described in Section 2. Even when safety and durability standards are in place to ensure product quality, some assistive products require ongoing maintenance, adaptations or repairs. The more customized and complex the product, the more likely it is that the user will need follow-up services to ensure optimal and sustained fit and function. Children and older people need more frequent follow- up services than others to match gradually changing body structures and functional abilities.

Limited physical and geographical access

Limited geographic and population coverage often puts assistive technology out of reach for potential users (**see Andriana's story**)[3]. For example, many assistive products and related services may only be available through selected tertiary hospitals in urban centres or the capital city, which can require extensive travel and overnight stays for users, their families and caregivers. Lack of accessible and inclusive transport, communication and physical environments create additional barriers. Even when provision covers broader geographical areas (including at community level), the range of assistive products can be limited.

Inaccessible facilities, equipment, information and negative attitudes of providers add to barriers to assistive technology.

Meet Andriana

Indonesia

Andriana lives with her mother and grandmother, some distance from the closest urban centre. She was born with an impairment that made walking difficult. When she walked, she dragged her feet, moved carefully and slowly, and often fell.

While Andriana was growing up, her mother and grandmother tried to get help from the local health clinic, but the medical staff were only able to treat common health conditions and did not refer them to another clinic that could address her disability-related needs. Thus, she did not know the cause of her impairments throughout her childhood.

The absence of needed services and inclusive attitudes during Andriana's youth contributed to some traumatic experiences. Andriana was persistently bullied in

[3] "Coverage" refers to currently met assistive technology needs, not legislative and policy level coverage that has yet to be implemented at the ground level.

school, so her family decided to withdraw her from school and keep her at home to help with daily chores. When an earthquake hit her village, she was not able to quickly escape her house. Some of the walls collapsed and she had to wait to be rescued.

When Andriana was 22 years old, she and her family were introduced to a visiting physiotherapy team by a local organisation. Andriana learned that she has cerebral palsy, and her needs were assessed. She was fitted with orthopaedic shoes and provided with physical therapy. After only three visits she learned how to walk safely with her new shoes. She also noticed that physical therapy helped to relieve pain in her back. One of her family members expressed their gratitude for Andriana finally receiving this critical and long-awaited care, "On behalf of her family, I would like to say thank you very much… and we hope that the government could pay more attention to us."

Inadequate products

Low quality

National and international technical standards determine product quality in terms of strength, durability, performance, safety, reliability, comfort, etc. Poor-quality assistive products exist due to inadequate standards, lack of regulatory enforcement and lack of knowledge about the need for safe and effective products. When users have no access to affordable, safe and effective assistive products, the only alternative may be a substandard device that does not meet needs or match local context *(137)*.

The enforcement of standards is a complex and costly task given the range of assistive product types and assistive technology suppliers and providers (e.g. pharmacies, NGOs, manufacturers and individual private brokers). Determining if assistive products adhere to safety and performance standards often requires trained experts in different specialties and enforcement by regulatory agencies. It is essential that assistive products comply with adequate standards to avoid further harm and lack of reliability and usability *(138)*.

Limited range, option and quantity

Many countries have inadequate ranges, options and quantities of assistive products as evidenced from the survey outcomes presented in Section 2, where assistive products in use – as well as service provision – primarily included basic products to support vision, mobility and hearing. Assistive products, including spare parts, are frequently imported because local (national) manufacturing capacity is limited both in the scale of production and product range (types, sizes, price points) *(25)*. Even in countries that have local capacity to design and test assistive products, manufacturing equipment may be imported.

Although importing assistive products is a feasible and cost-effective option, inadequate buying power (even in bulk quantity) can be the most significant barrier to increasing national supply. Other barriers include the lack of information to enable buyers to compare and purchase assistive products on the global market, and a limited range of assistive products that are suitable for a diversity of local contexts, particularly assistive

products designed for and tested in low-resource settings *(139)*. Donations of new or second-hand assistive products, which meet standards and regulatory requirements, can be a major supply source in some countries. However, donations can have limited and inconsistent supply and may be of poor quality *(140)*.

Lack of repair, refurbishment and reuse of assistive products reduce how long they can be kept in circulation within a service delivery system to meet the needs of more than one user. The exclusion of spare parts at the time of or after purchasing assistive products can lead to abandoned products. Additionally, manufacturers may not design assistive products to ensure easy repairs, or may restrict supply of spares causing additional economic hardship on users and family members.

Assistive products need to match the needs of all age groups, functional requirements and environments. Sometimes designers and manufacturers tend to develop high-end and or high-margin products for a minority group rather than the majority. Also, an emphasis on producing urban-oriented assistive products rather than products suitable for use in rural or all-terrain environments can lead to lack of access to appropriate products or abandonment of provided products.

Lack of supply

Changing funding priorities and broader economic instability can cause an erratic supply of assistive products. The programming priorities of governments, NGOs and development partners depend on funding cycles, need, political priorities and agendas.

Public ministries involved in assistive technology procurement may be subject to shifting leadership and budget priorities *(141)*.

At the macroeconomic level, fluctuating international exchange rates and financing system instability (e.g. banking, inflation) influence the buying of assistive products. During a crisis, assistive product sourcing and supply can be halted. Health product supply chains around the world were disrupted by the COVID-19 pandemic (e.g. high freight costs) *(142)*. Given that these crises themselves can result in injuries that require additional supply of assistive technology, designing resilient assistive technology supply chains and systems that function during crises is imperative *(143,144)*.

Poor suitability

When assistive products are mismatched for user needs, they can cause harm or be abandoned. For example, a video relay service may be the most effective solution for someone who has hearing difficulties, but lack of consistent Internet access makes this option unsuitable. In addition, evidence shows that users' perceived usefulness of assistive products and user choice improves adoption and outcomes *(145)*. Aesthetic preferences are particularly important for prominent devices (e.g. spectacles) and specific populations (e.g. young adults) *(146)*. Despite the importance of design for the willingness to access and use assistive products, many of them are neither child- nor gender-friendly.

Procurement and delivery challenges

Procurement practices determine what is purchased (i.e. products, spare parts and accessories, and services), alongside factors such as price and contractual arrangements with buyers and suppliers. Poorly designed, funded and managed procurement and delivery processes delay and reduce access and can be overlooked when identifying bottlenecks in the assistive technology system.

The wheelchair is my leg, my chair and my everything.
Sammy (32), Kenya

Inefficient procurement

Procurement mechanisms can be fragmented across and within ministries and multiple sectors (e.g. NGOs, private health care), and can cause fluctuations in quantity and characteristics of assistive technology from year-to-year *(140)*. Procurement priorities are rarely demand-driven because of lack of data.

Gatekeepers that determine what assistive products are ultimately purchased (e.g., procurement officials, budget managers) may not always make the best buying decision or take user preferences into consideration. Even when adequately trained assistive technology professionals suggest a specific product, purchasing decisions by procurement officials can default to the lowest cost option due to budget limitations or inadequate training. Consulting users while doing large-scale procurement is almost unheard of.

Inefficient delivery

Inadequate delivery systems to get assistive technology or other health products to users present a bottleneck in assistive technology systems *(141)*. Lack of transparent information systems (e.g. for inventory, tracking), poor delivery infrastructure, inefficient distribution channels, mismanagement of supply warehouses etc. can all create a host of logistical challenges in getting purchased products to users **(Box 3.1)**. In addition, product delivery delays or non-inclusive services can prevent someone from moving forward along the access pathway. Delays may also worsen users' health status or lead to poor usage *(147)*.

Box 3.1 Assistive technology procurement study: WHO Western Pacific region

A procurement study in the WHO Western Pacific region found that procurement for assistive technology is not well integrated into government annual budget and planning cycles, and thus receives minimal and inconsistent funding from year-to-year. The provision of assistive technology is limited for all categories, with the least availability for low-vision, communication, self-care and cognition products.

Source: Assistive technology procurement study: technical report. Manila: World Health Organization Regional Office for the Western Pacific; 2020 *(140)*.

Workforce capacity gaps

Workforce shortfalls limit geographic and population coverage and compromise the quality of assistive technology services *(148,149)*. As indicated in Section 2, many countries have limited or no assistive technology dedicated professionals able to offer expertise in a broad range of assistive products. Given the broad scope of assistive technology and the multi-tasking skills required in many product categories, the breadth and depth of dedicated training of assistive technology professionals is not feasible in all contexts. Lack of data on the extent and nature of this workforce shortage hinders advocacy and policy-making efforts.

The degree of specialization, training requirements and practice standards vary across the diverse range of assistive technology disciplines and sectors (i.e. public, private and non-profit), creating a fragmented landscape for human resource planning.

Overall, there are too few well-trained assistive technology personnel, whether they are direct service providers, or part of the broader assistive technology workforce (which supports the functioning of the assistive technology system itself).

Lack of direct service providers

Academic and professional training programmes that prepare assistive technology professionals are few and far between and may in any case not adequately equip direct service providers with the knowledge and skills to meet the diverse needs of users. Assistive technology competence is not just knowledge of assistive products and how they might assist a person with a functional difficulty – it also involves understanding the implications of the health condition of the person and the future outlook, awareness of environmental barriers, context awareness, and supporting the user in realizing life goals using the assistive product. A lack of skilled professionals to support the choice and personalization of assistive products can lead to poor procurement choices **(see Jack's story)**. Providing the incorrect assistive products can also result in abandonment, developing secondary conditions or even premature death *(150)*.

Meet Jack

Papua New Guinea

Jack is 17 years old, and lives in the remote highlands of Papua New Guinea. As a young teenager, Jack sustained a spinal cord injury when a tree fell on him. He was cared for in the local hospital, where he was provided with a donated, second-hand wheelchair. This wheelchair was too large for him, had no cushion to protect him from pressure wounds, and he was unable to propel himself in it.

Recognising Jack's need, a collaborative effort by his community, the local hospital, the government wheelchair provider based in Port Moresby, and support from donors and a non-government organisation, enabled an outreach visit by the government wheelchair provider. Two staff made the journey, including a flight and five hours four-wheel driving.

For Jack, meeting the trained staff provided him with a chance to learn more about how to use his wheelchair including how he can propel himself. He was more comfortable in the new wheelchair, better protected from pressure wounds, and able to access and move about his school.

Since the initial visit, the outreach programme has continued, further supporting Jack and others in his community.

Limitations in broader assistive technology workforce

In addition to direct service providers, there is a lack of personnel that play important roles in the assistive technology system (e.g. biomedical and rehabilitation engineers involved in the design, development and production of assistive products). Trained staff are also needed in a variety of roles to effectively operationalize assistive technology policies and plans (e.g. procurement managers). There is a need to attract many different types of well-qualified personnel into the assistive technology field, such as nurses, pharmacists and community health workers. Unlike the medicines sector, assistive technology may not be treated as a holistic sector in professional training programme or in the labour market, where industry-specific positions (e.g. assistive products supply chain management) are commonly available.

Market failures

The current and growing demand for assistive products globally has yet to translate into actions addressing various forms of market shortcomings *(139)*.

Market fragmentation

The potential market size of the current and future assistive technology sector is not known, partly because assistive technology is not treated yet as a distinct sector. The fragmentation of provision and funding, along with the broad range of assistive products and related services, means that assistive technology is viewed in categories, subgroups of users or disciplines, and not as the collective and vast global market it represents.

Inadequate demand information

On the supply side, manufacturers and suppliers lack information to estimate demand *(151)*. On the demand side, buyers from all sectors (i.e. public, private, non-profits) and users are not equipped with necessary information that allows them to compare product features and purchase products.

Barriers to market entry

For manufacturers or suppliers, getting new assistive products certified – especially when they are recognized as medical products, and covered by financing schemes – can be a time- and resource- intensive process. Likewise, getting registered as a new assistive technology company (i.e. start-ups, manufacturers, suppliers, or support services) can

be a lengthy process. Inconsistent product specifications and standards can also pose a disincentive to market entry.

Governance and funding issues

Low policy profile

Lack of awareness about the scope and scale of assistive technology needs and the potential benefits of assistive technology access to individuals, communities and broader society lead to the low prioritization of assistive technology, and legislation that does not always cover people with all types of functional difficulty (as the progress indicators on system preparedness presented in Section 2 reveals). Coverage is inadequate and inconsistent in terms of who is eligible to receive assistive technology, and what types of products and services are covered. Access to assistive technology has been shown to increase participation in socioeconomic activities, and reduce poverty and hunger for users and their households, yet there is a lack of disaggregated data on the return on investment for different types of assistive products to motivate public or private sector funding *(152)*.

Lack of funding and investment

As demonstrated in Section 2, there is inadequate funding for products and services, and lack of investment in strengthening national assistive technology programmes and systems. Funding mechanisms for assistive technology can reside with ministries (e.g. health, education, labour and social welfare), or be privatized like private health or social welfare insurances and schemes, or follow a hybrid model of public–private partnership. There can also be disparities in funding levels by geographical area within a country. Where provision of assistive technology has been part of welfare or charity-based services it may not have been fully integrated into public funding streams and services *(153)*.

During budget decision-making at national or district levels, assistive technology may not be a discrete category but is instead covered under a general line (e.g. consumables, or products for older people or people with disabilities). Without a dedicated budget for assistive technology (and for specific types), it is hard to advocate for an increased budget or track assistive technology expenditure.

Fragmentation of the assistive technology sector

Fragmentation of assistive technology provision among sectors, departments and ministries increases the complexity of information users need about how to gain access to assistive technology. A pathway to access assistive technology often varies based on a user's profile, assistive technology needed and context. Fragmentation is due to the wide range of assistive products and the way the sector has been developed or professionals have been trained thus far. Professional silos, fragmented funding and provision mechanisms, and multiple access pathways characterize the sector *(153)*. While some countries have designed and implemented an integrated assistive technology system that covers the full range of assistive products, others have a piecemeal approach with little coordination among the stakeholders.

Sociodemographic barriers

Access barriers can be unique to different users and overcoming them is essential to achieving equitable access to assistive technology. Sociodemographic factors such as age, gender, type of functional difficulty and socioeconomic status have been reported to influence access *(154)*.

Age

Stigma among peers or non-inclusive school settings can prevent children from accessing or using assistive technology *(25)*. Families' beliefs about children's capabilities and the benefits of assistive technology play a major role in accessing it **(see Lupita's story)** *(155)*. Lack of time and necessary support can be a hindering factor for people at working age to access assistive products, as they cannot afford loss of income due to time off work. As people age, the need for assistive products increases, and older people likely need multiple assistive products as discussed in Section 2 *(156)*. However, inaccessible physical environments or information sources can create extra barriers for older people to access assistive products and services without support from their family. Low availability of assistive products that meet the needs of older people can also be a barrier *(157,158)*.

Meet Lupita

Nicaragua

Martha, or 'Lupita' as her family and friends call her, is a lively and cheerful young girl. She lives with her mother and extended family on the outskirts of the city of Leon, Nicaragua. When Lupita was six months old, the family noticed that she had problems following sounds produced by toys and 'chichiles', a Nicaraguan handmade rattle.

Lupita was diagnosed with a hearing impairment, a condition that has had a big impact on her relationship with other children in her neighbourhood. They refer to Lupita as a 'rare animal', as she can neither hear nor talk and communicates only via signs. In addition to a hearing impairment, Lupita has stiffness in her legs, which meant it took her longer to walk and affected her moving around.

Lupita and her family have been supported since her diagnosis by a local organization with language stimulation therapy and introduction of sign language. The family were also very keen for Lupita to have hearing aids as soon as possible. They felt that this would assist her development and help her to better integrate with her community. Since receiving her hearing aids, as she adjusts to them, Lupita continues to participate in language therapies and uses sign language to keep developing her overall use of language. Most importantly she has now joined her peers at school and is rapidly gaining confidence.

Gender

The outcomes of the population surveys reported in Section 2 indicate that women tend to access assistive products to a lesser extent than men, although there are variations between countries. In some countries, men were twice as likely than women to access assistive products. Assistive products, professionals and service delivery systems are not always gender-friendly. Even privacy is compromised while providing assistive products especially during mass distribution. Previous studies have found that women are less likely to access assistive technology because of financial and cultural factors *(39)*. This is in line with evidence showing difficulties for women with disabilities to access health care in general due to sociocultural, financial and structural barriers in some countries *(159)*.

Type of functional difficulty

Low awareness of the variety of assistive products is a barrier to access, especially for people with certain functional difficulties. This was reflected by the low prevalence of use of assistive products in communication, cognition or self-care. The barrier could have been worsened by the low service coverage in certain functional domains, as revealed in Section 2. People with multiple or severe functional difficulties face additional hardships to access all the assistive products they need.

Living environment

The population surveys presented in Section 2 found that access to assistive products was lower for people living in rural areas compared to urban areas. Limitations in the range of assistive products, low coverage of assistive technology providers and poor infrastructure in rural or remote living areas can impose additional barriers for people to access and use their assistive products **(Box 3.2)** *(160)*.

Box 3.2 Accessing assistive technology in remote settings (Canada)

In northern Canada, a combination of factors such as harsh cold weather and infrastructure issues contribute to reduced access to assistive technology. Travel by boats, snowmobile and sleds can be particularly challenging for those with locomotor disabilities, while assistive technology that depends on electricity can be compromised by power interruptions. Governments can fulfil their responsibility under the UN *Convention on the Rights of Persons with Disabilities* by designing assistive technology systems that are context-sensitive.

Source: Altin N, MacLachlan J, Phenix A, Nixon S. Colonization, climate, and critical analysis: Examining access to assistive technology in Northern Canada using the World Health Organization's Global Cooperation on Assistive Technology initiative. In N. Layton, J. Borg (Eds), Global perspectives on assistive technology: proceedings of the GReAT Consultation 2019, World Health Organization, Geneva, Switzerland, 22–23 August 2019. Volume A *(160)*.

Socioeconomic status

The outcome of the population surveys in Section 2 suggested a strong association between access to assistive products and the socioeconomic status across the surveyed countries. High out-of-pocket expenditure for the products is the most frequently reported barrier by participants in almost all surveyed countries.

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