



National Guidelines on the Provision of Assistive Technology in Papua New Guinea

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Accessibility

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Acronyms and abbreviations

| | |
|------------|--|
| ADLs | Activities of Daily Living |
| AFO | Ankle Foot Orthosis |
| APL | Model List of Appropriate Assistive Products |
| AT | Assistive Technology or Assistive Technologies |
| BTE | Behind the Ear |
| BW | Body Worn |
| CBR | Community Based Rehabilitation |
| CD | Compact Disc, a data storage format |
| CRPD | Convention on the Rights of Persons with Disabilities |
| CSHC | Creative Self Help Centre, Madang |
| DAISY* | Digital Accessible Information System, DAISY A Better Way to Read |
| DFAT | Australian Government's Department for Foreign Affairs and Trade |
| DFCDR | Department for Community Development and Religion |
| DPOs | Disabled People's Organisations |
| DOE | Department of Education |
| DOH | Department of Health |
| ENT | Ear Nose and Throat |
| EVA | Ethylene-vinyl Acetate |
| FO | Foot Orthosis |
| GATE | Global Cooperation on Assistive Technology |
| GESI | National Public Service Gender Equality and Social Inclusion Policy |
| GST | Goods and Services Tax |
| Guidelines | National Guidelines on the Provision of Assistive Technologies in Papua New Guinea |



| | |
|------------------|---|
| IAPB | International Agency for the Prevention of Blindness |
| ICT | Information, Communication and Technologies |
| Incheon Strategy | Incheon Strategy to “Make the Right Real” for Persons with Disabilities in Asia and the Pacific |
| ITE | In the Ear |
| ITC | In the Canal |
| iPad** | iPad mobile digital device |
| ISO | International Standards Organization |
| ISPO | International Society for Prosthetics and Orthotics |
| JAWS*** | Job Access with Speech, JAWS® screen reading software** |
| KAFO | Knee Ankle Foot Orthosis |
| KO | Knee Orthosis |
| LED | Light-emitting Diode |
| NACD | National Advisory Committee on Disability |
| NBDP | National Board of Disabled Persons |
| NGO | Non-government Organisation |
| NHAA | National Health and Administration Act 1997 |
| NISIT | National Institute of Standards for Industrial Technology |
| NOPS | National Orthotics and Prosthetic Service |
| NPD | National Policy on Disability 2015-2025 |
| NVDA**** | Non Visual Desktop Access |
| P&O | Prosthetics and Orthotics/Prosthetist and Orthotist |
| PCCD | Provincial Coordinating Committee on Disability |
| PNG | Papua New Guinea |
| PNGADP | Papua New Guinea Assembly of Disabled Persons |



| | |
|----------|--|
| PT | Physiotherapist or Physiotherapy |
| SACH | Solid Ankle Cushioned Heel |
| SERC | Special Education Resource Centre |
| SHG | Self Help Group |
| SPSN | Strongim Pipol Strongim Nesen |
| TV | Television |
| UN | United Nations |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNICEF | United Nations Children Fund |
| USAID | United States Agency for International Development |
| WASH | Water, Sanitation and Hygiene |
| WATP | Walking Aid Training Package |
| WHO | World Health Organization |
| WSTP | Wheelchair Service Training Package |
| WSTP – I | Wheelchair Service Training Package – Intermediate Level |
| WSTP-B | Wheelchair Service Training Package – Basic Level |

* *DAISY, A Better Way to Read is a trademark of the DAISY Consortium.*

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**** *NVDA is a free screen reader by NV Access that enables people who have vision impairment to use computers, available from <http://www.nvaccess.org>.*



Key assistive technology terminology

The following words are used throughout these Guidelines. The meaning of each word as it is used in the Guidelines is described below. More terminology is introduced at the beginning of chapters 5-7.

| | |
|----------------------------|--|
| Assistive Technology (AT)* | <p>AT includes any item, piece of equipment, or product that helps a child or adult carry out tasks they might not otherwise be able to do well or at all. AT helps to reduce the impact of impairment and increase, maintain, or improve the ability of people with disabilities to do their daily activities, and be an active part of family, community and civil life.</p> <p>Examples of AT used by persons with a disability include: wheelchairs, prostheses, orthoses, walking aids, hearing aids, white canes, low vision aids.</p> <p>Throughout these Guidelines the following terms are used to describe different categories of AT:</p> <ul style="list-style-type: none">• Vision AT: AT that may be used by a person with a vision impairment• Hearing AT: AT that may be used by a person with a hearing impairment• Mobility AT: AT that may be used by a person with a mobility impairment |
| Appropriate AT | <p>AT that:</p> <ul style="list-style-type: none">• Meets the user's needs and the conditions in which they they live, work and learn• Is provided through a service by trained personnel• Is safe and durable• Is available in the country; and• Can be obtained and maintained at an affordable price. |
| AT provision | A term that includes AT design, production, supply and service delivery |
| AT procurement | The process of obtaining (purchasing or receiving donations) appropriate AT including: identifying suppliers, assessing and selecting the most appropriate AT, managing transport and storage. |
| AT service | An important part of AT provision that includes trained personnel matching an individual user's needs with the most appropriate AT; preparing and fitting AT for an individual; providing training for an individual user in how to use and care for their AT; and ongoing support including repairs and maintenance as required |
| Service providers | The organisations involved in carrying out AT service delivery. Service providers in PNG may be government and/or non-government organisations. |

**PNG stakeholders agreed to use the term "Assistive Technology"(AT) in these guidelines instead of "Assistive Devices". AT better encompasses the range of different products persons with hearing and vision impairments use, enabling them to actively participate in daily activities.*



Minister's foreword

These first ever National Guidelines on the Provision of Assistive Technology in PNG are an important step in implementing our obligations under the Convention on the Rights of Persons with Disabilities. Access to appropriate Assistive Technology (AT) for persons with disabilities is a human right. AT is essential in helping to remove the barriers that prevent girls and boys from going to school; women and men from accessing work and taking on their chosen roles in their families and communities; and importantly, enables persons with disabilities to participate in the development of our country.

These Guidelines are significant as they support and guide best practice service delivery in PNG, in line with the Government's commitments to persons with disabilities. These Guidelines supplement key national policies and plans including Vision 2050, the National Policy on Disability 2015-2025, the National Health Plan 2011-2020, the National Public Service Gender Equality and Social Inclusion Policy and the Special Education Policy by providing the "how to" for providing appropriate AT services to our people within a service system equipped with trained personnel and appropriate products.

We take this opportunity to inform national, provincial and local level governments and all stakeholders that these Guidelines are for you. They are a tool to help you do your part in unlocking the potential of many of our brothers and sisters with disabilities, particular those with hearing, vision and mobility impairments. As our knowledge, experience, capacity and resources grow, we aim to expand the reach of these Guidelines to include AT and services for all persons with disabilities.

We urge all stakeholders to read and share these Guidelines with staff, members and partners, incorporate them into your policies and systems, implement and monitor the principles, strategies, recommended AT, tools and procurement checklists provided, ensuring that users are involved throughout. Importantly, these Guidelines provide PNG the opportunity to be international leaders as we are the first country in our Region to develop Guidelines that

cover effective AT service delivery for people who have hearing, mobility and vision impairments together.

We must take implementation and monitoring of the Guidelines seriously so that not only our people can access the AT they need, but so that we can contribute to improving AT services for all. We have an opportunity to share our good practices with the wider global community and give PNG a voice in global discussions about what makes AT services effective in a diverse context like ours.

Finally, we sincerely commend all stakeholders across the four regions of our country who have played a role in developing and shaping these Guidelines including the PNG Assembly of Disabled Persons and the network of disabled people's organisations, service providers and members of the National Board of Disabled Persons, provincial and local level government governments and authorities, civil society and faith based organisations, development and private sector partners. Notably, we thank the PNG Guidelines Steering Committee and our project partners PNG Assembly of Disabled Persons, Motivation Australia, Strongim Pipol Strongim Nesen and the Australian Government for their efforts in supporting us to make rights real through these Guidelines.

Our goal moving forward is that we work together so these Guidelines enable more children to access a hearing aid that suits them and allows them to learn and play with their peers; that more people who need a wheelchair, walking stick or prosthetic limb have more independence to move around their communities and participate in their chosen activities; and that more people can access news and information by getting the spectacles, magnifiers or audio equipment they need to participate in society. We look forward to our continued partnership in implementing these National Guidelines on the Provision of Assistive Technologies in PNG.

Text prepared for this zero draft, for consideration by Ministers of Health, Community Development and Education.



Executive summary

In 2013 the Government of Papua New Guinea (PNG) acceded the United Nations Convention on the Rights of Persons with Disabilities (CRPD) [1]. PNG's accession demonstrates a growing commitment to promoting, protecting and fulfilling the rights of persons with disabilities in all aspects of PNG society on an equal basis with others. This commitment includes the recognition that access to appropriate assistive technologies (AT) is a human right.

Access to appropriate AT for girls, boys, women and men with disabilities is a fundamental step in removing participation barriers and *“enables persons with disabilities to become productive members of society, thereby enhancing their quality of life, enabling them to enjoy their human rights and live in dignity”* [2].

PNG stakeholders strongly state that *effective* provision of AT in PNG requires:

- Maximum involvement of the user at every stage of AT service delivery.
- Policy and guidelines that support and guide practice.
- Services that reach women, men, girls and boys who need them.
- Training for local people.
- Appropriate products.

Improving access to appropriate AT is not a new focus for PNG. PNG stakeholders have been working for many decades to ensure persons with disabilities are equipped with the AT and services that benefit them. However, stakeholders asked for and invested in the development of these Guidelines between 2013 and 2016 so that they would have a tool to support and guide best practice AT service delivery in PNG.

These Guidelines are therefore unique in that they have been written for and by persons with disabilities, disabled persons organisations, service providers, government, civil society and faith based organisations, development partners and the private sector to provide practical guidance and recommendations on how to strengthen: rights based governance, policy and leadership relevant to AT for persons with hearing, mobility and vision impairments; user

involvement; equitable AT service systems and service reach; minimum AT training requirements for local personnel; and recommended AT for the PNG context. The content was guided by the technical knowledge and personal experience of PNG citizens as well as international AT guidelines, standards and products that were tested and adapted by PNG people for the PNG context.

It is recognised that strengthening AT services in PNG will take commitment, collaboration, time and investment of everyone in all areas of effective AT provision to ensure that AT is provided through a service system, with trained personnel, who can work with persons with disabilities to provide quality AT that suits their needs, lifestyles and environments.

PNG stakeholders are strongly against donations and handouts that are provided: without consultation with local partners and users; outside the service system; and without the presence of trained personnel. They state that ‘this is not the rights based way!’

Recognising that there are many different types of AT, it was a deliberate choice by stakeholders to focus these Guidelines on a short list of recommended AT required by and benefitting persons with mobility, hearing and vision impairments. It was agreed that these Guidelines needed to start small and evolve over time as knowledge, experience, skills and capacities of all stakeholders grows. It is the intention that these Guidelines will expand in the future to address AT priorities of all persons with disabilities.

These Guidelines are not prescriptive, and rather are designed to assist the practical implementation of existing national policies and plans across several sectors that have a specific focus on improving access to AT services including health, education, community development and the public sector. Implementing and monitoring the Guidelines also present PNG stakeholders with an opportunity to be international leaders; creating evidence about how the rights of persons with disabilities to accessing appropriate AT can be realised in a culturally rich and geographically diverse context like PNG.



Guidelines structure

The following diagram shows how the Guidelines are organised into eight chapters:

1. About these Guidelines: An overview of the purpose and scope of the Guidelines, how they were developed, who they are for and a roadmap for moving forward.

2. Policy framework and the AT situation in PNG: Outlines the PNG Government's commitment to effective AT provision, who uses and how many people need AT in PNG, the barriers to effective AT provision, the problems of poor AT provision and PNG within the international AT context.

3. Effective AT provision in PNG: Describes five key elements of effective AT provision: maximum user involvement, policy and guidelines, effective services people can reach, training for personnel, appropriate products.

4. Strengthening AT provision in PNG: Outlines guiding principles and strategies for AT provision in PNG; and how PNG stakeholders have agreed to work to strengthen AT provision across the country.

5. Hearing: Why hearing AT is important, and for whom, what is needed to provide AT for people with a hearing impairment, strategies to increase access to hearing aids including service, training and product recommendations.

6. Mobility: Why mobility AT is important, and for whom, what is needed to provide AT for people with a mobility impairment, strategies to increase access to mobility AT including service, training and product recommendations.

7. Vision: Why vision AT is important, and for whom, what is needed to provide AT for people with a vision impairment, strategies to increase access to vision AT including service, training and product recommendations.

8. Annex: Contains a set of tools to support provision of appropriate AT in PNG including an explanation of ISO standards, data sets for AT service providers, procurement checklists for some of the AT described in these Guidelines and strategies for advocacy and awareness raising.



Chapter One: About these Guidelines

This chapter describes:

- The purpose of these Guidelines, who they are for, their scope and the development process.
- What Assistive Technology is and which Assistive Technology these Guidelines focus on.
- A roadmap for moving forward.



1.1 Why these Guidelines?

“Across the world, people with disabilities have poorer health outcomes, lower education achievements, less economic participation and higher rates of poverty than people without disabilities. This is partly because people with disabilities experience barriers in accessing services” [3].

In order to perform their daily activities, many girls, boys, women and men with disabilities benefit from AT. The use of AT however, is only helpful if the AT is readily accessible and meet the user's needs, daily activities and lifestyle. *“When the need is not met, persons with disabilities are isolated and do not have access to the same opportunities as others within their own communities” [2]*

The situation in PNG at the moment, as in many other developing countries in the Pacific Region and globally, is such that there is not a clearly defined national standard for the provision of AT. People with disabilities often do not have access to AT because they live too far away from AT services, have never heard of or cannot afford AT. Some people may have received AT, however it does not suit their individual needs, where they live, work, go to school or their lifestyle. This means that the AT is not helpful, and in some cases may be harmful.

Government and Non-Government Service Providers in PNG face challenges in meeting the need for AT. These challenges are often due to budget and logistical difficulties in procuring AT, limitations in the number and capacity of personnel to provide AT, and challenges in reaching people who need them [4].

PNG stakeholders feel strongly that the practice of handing out AT in the absence of trained personnel and a service delivery system is unacceptable and not recommended. *The PNG National Policy on Disability 2015-2025* directs stakeholders to “Remove Barriers, Make the Rights Real”, to build on their existing work and to develop the standards, guidelines and mainstreaming necessary to improve the quality of services available for persons with disabilities [5].

These Guidelines are an important step towards fulfilling this directive, implementing PNG's obligations under the *Convention on the Rights of Persons with Disabilities* [6] and ensuring that the *PNG National Health Service Standards for Papua New Guinea 2011-2020* [7] are delivered in a rights based way. PNG stakeholders also identify these Guidelines as an important tool to negotiate and coordinate donor support for improved quality of AT and AT services for the people of PNG.

The purpose of these *National Guidelines for the Provision of Assistive Technologies in PNG* is therefore to provide a framework for a national standard of care in appropriate AT provision, for women, men, girls and boys with mobility, hearing and vision impairments, regardless of their age, location, ethnicity, and socio-economic background. It is hoped that these Guidelines will help ensure that users receive appropriate and affordable AT that suit their needs, daily activities and lifestyles, while satisfying minimum requirements for safety, strength and durability, and that service providers are trained in all steps of the service provision cycle.

These Guidelines draw on international standards and guidelines set out by organisations like the World Health Organization (WHO) and the International Agency for the Prevention on Blindness (IAPB). The reason for this is to make sure that national authorities and providers of AT can offer PNG citizens with disabilities and their families and caregivers quality products and services that are informed by research, evidence and best practice. The Guidelines are also a tool to help users have the control and choice about what AT will help them in their daily activities and to be active participants in PNG society. PNG Citizens deserve nothing less!



1.2 What is Assistive Technology?

Assistive Technology (AT) is any item, piece of equipment, or product that helps a child or adult carry out tasks they might not otherwise be able to do well or at all.

AT helps to reduce the impact of impairment and increase, maintain, or improve the ability of people with disabilities to do their daily activities, and be an active part of family, community and civil life. AT is used by girls, boys, women and men with different impairments, for different activities, and at different times in their lives.

Some AT is used by groups of people (such as audio to text on a television, or a ramp on a public building). Some AT is for personal use. Figure 1.1 shows some of the different groups of AT for personal use, and examples for each group are given below:

- **Hearing:** Hearing aids, amplified telephones, doorbell indicators, software for gesture to voice
- **Mobility:** Wheelchairs, tricycles, prosthetic legs, crutches, walking frames, transfer boards
- **Vision:** Spectacles, magnifying glasses, telescopes, white canes, refreshable braille displays, screen readers, talking watches
- **Communication:** Communication boards or cards with letters, symbols or pictures; adapted writing and drawing equipment; electronic communication devices
- **Thinking and remembering:** Pill organisers, timers, time management products, item locators, task reminders
- **Modifying the environment:** Hand rails, ramps in and around the home, high contrast tape or paint on edges of stairs, flashing fire alarm lights as well as a siren
- **Washing, toileting and dressing:** Shower chairs, toilet seats, urinary management products, dressing hooks or sticks



Figure 1.1: Some categories of Personal AT.



1.3 What these Guidelines cover

These Guidelines are an important step in defining:

- What AT should be most readily available for PNG citizens.
- How girls, boys, women and men with a disability can access this AT safely and effectively.

PNG stakeholders recommended these Guidelines should 'stick to the basics', recognising that it is not possible to meet all needs immediately. The Guidelines therefore focus on AT that:

- Is used by women, men, girls and boys of all ages with long term **hearing, mobility and/or vision impairment** (see Figure1.2).
- Is likely to have the most impact on the lives of persons with disabilities.
- Can be delivered through existing services now or after some further training and capacity building.
- Is needed by and will reach a large proportion of women, men, girls and boys.
- Is safe and durable (quality).
- Can be obtained and maintained at an affordable price.

Even though the following AT and support services are very important for persons with disabilities, stakeholders agreed that to keep these initial Guidelines small, these first Guidelines will not include all AT, rehabilitation equipment (eg. parallel walking bars, neck braces), community resources (eg. sign language and braille printers), accessible infrastructure or home modification solutions.

Many of the principles and strategies in these Guidelines can however be applied to all AT, and specific Guidelines on these important services can be developed and rolled out over time.



Figure1.2: Categories of Personal AT covered in the scope of these Guidelines.

These Guidelines are deliberately not prescriptive. Rather they offer PNG Government, persons with disabilities, service providers and the wider community guidance and tools to assist in improving access to appropriate AT at local, provincial and national levels now and in the future through:

- Maximum user involvement at every step
- Policy and guidelines that support and guide effective AT provision
- Effective AT services that people can reach
- Training for local AT personnel
- Identifying a short list of appropriate AT products to be most readily available for PNG citizens

The Guidelines are aligned with PNG policies and standards; and the different levels of service delivery at local, provincial and national levels.

It is the intention that these Guidelines will expand in the future to address AT priorities of all persons with disabilities including persons with an intellectual impairment and persons experiencing psychosocial disabilities.



1.4 Who are these Guidelines for?

These guidelines are for users, providers and policy makers in PNG. This includes:

- Users of AT, their families and caregivers
- Disabled People's Organisations (DPOs) and Self Help Groups (SHGs)
- Government and non-government health, education, rehabilitation and disability service providers
- Government and non-government policy makers, planners, and data collectors
- Personnel of disability services including managers, service staff and volunteers
- Producers and suppliers of AT to PNG
- National and international donors of AT and/or disability services to PNG

1.5 How these Guidelines were developed.

These Guidelines were started as part of the PNG Access to Mobility project (2012-2014) funded by the Australian Government in partnership with the Government of Papua New Guinea through the Strongim Pipol Strongim Nesen (SPSN) program. Access to Mobility was a partnership project between Motivation Australia, the PNG Assembly of Disabled Persons (PNG ADP), and the National Orthotics and Prosthetics Service (NOPS) of the Department of Health, PNG.

Supporting the development of *National Guidelines on the Provision of Mobility Devices* was a key objective of the Access to Mobility project. A draft was developed and in 2014, a series of consultation workshops and a multi-stakeholder forum were held with PNG stakeholders to discuss the draft. Stakeholders included users of AT, disability advocacy groups and government and non-government service providers.

These consultations helped raise awareness about "appropriate" AT provision, and led to the

Guidelines being expanded to encompass AT for persons with vision and hearing impairments.

In 2015 additional funding was received through SPSN to further the Guidelines and a multi-stakeholder Steering Committee was formed. Representatives from government (Health, Education and Community Development and Religion); PNG Assembly of Disabled Persons; representative organisations of people with blindness, low vision, hearing impairment and mobility impairment; service providers (National Board of Disabled Persons, Network of Callan Services, Prevention of Blindness Committee) and development partners came together to ensure the Guidelines complied with the CRPD; aligned with existing guidelines, policies and systems in PNG; and that decisions were made with the best interests of users in mind.

Broad consultations and focus groups across the four regions of PNG were carried out by a Project Team made up of Motivation Australia and PNG Assembly of Disabled Persons personnel and guided by the Steering Committee. Between 2015-16 consultations were held with more than 250 individuals from more than 50 organisations and/or departments. These consultations enabled an in-depth focus on AT products and services for people with hearing, mobility and vision impairment. Stakeholders, particularly PNG citizens who use or require AT, contributed their personal experience and knowledge about what is needed and why. Stakeholders also applied, tested and adapted international standards and guidelines developed by the International Standards Organization (ISO), WHO and IAPB and explored various AT options to identify appropriate AT for PNG people.

Input and feedback gathered in PNG over three years of consultations has shaped the content and structure of these Guidelines.



1.6 What now? A roadmap to implement the Guidelines

The Steering Committee for these Guidelines suggests the following immediate actions to start implementing the Guidelines. Chapter 4 provides more detailed strategies for strengthening AT provision in the short, medium and long term for all stakeholders.

1. PNGADP, single line DPOs, DOH, DOE, DFCDR and NBDP notify the public about and share copies of the Guidelines with all stakeholders.
2. DOH, DOE and DFCDR to meet to discuss the Guidelines and formalise the governance mechanisms for Guidelines implementation and monitoring as well as transparent AT procurement processes.
3. All stakeholders advocate and raise awareness about the Guidelines be carried out among all stakeholders so that the role of the Guidelines, especially its importance in supporting CRPD implementation (refer Annex 1: Advocacy and Awareness Raising Strategies for more detail and suggested strategies). DPOs and Service Providers provide training on the Guidelines to members and personnel so that they are enabled to use the Guidelines in their daily work.
4. Provincial and Local Level Governments, DPOs and Service Providers meet to identify implementation priorities within the Guidelines, which can be integrated into annual activity plans, operational plans and budgets.
5. DPOs and service providers integrate the Guidelines into their own policies and processes such as their strategic and advocacy plans, monitoring and evaluation activities, and staff performance reviews.

Awareness raising: How “word of mouth” in the community can help open up opportunities for girls and boys with disabilities to get an education: Kathleen’s story



Kathleen is 16 years old. She is from Mt Hagen and lives in Kimbe with her parents, three brothers and one sister.

She likes to play rubber band and marble games with her friends in the village. Kathleen has low vision in her left eye and no sight in her right.

When Kathleen was school age her parents sent her to a local school. She only stayed three days because she was being teased. When Kathleen was 15, her mother, Susan, heard about Callan Services from a friend at church. With the help of the local community development officer Kathleen was referred to Callan Services because *"I wanted Kathleen to be educated just like other children"* says Susan.

Kathleen is enrolled in the beginner program at Callan Services. The beginner program is for students of all ages who have not had a chance to go to school. Students learn the skills they need to integrate into a mainstream school. Kathleen says *"I am learning times tables, abc, 123. I can count to 100, I like drawing. Colouring is my favourite. When teachers write on the board it's hard for me to see it clearly but the teachers bring the work close to me and make it big so I can see it. They write in big writing and in bright colours like orange, blue and yellow. It's best to have big writing."*

Susan says *"Since school, when she gets homework she goes to her room and does it by herself. If she needs any help she will ask for help. She is a lot happier and doesn't want to stay at home. We are happy to travel 30 minutes by PMV to make sure she can go to school."*

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Chapter two: Policy Frameworks and the Assistive Technology situation in PNG

This chapter outlines:

- The PNG Government's commitment to the rights of persons with disabilities and to AT provision.
- PNG specific and global research to describe who uses AT, how many people are likely to need and benefit from AT, the barriers to effective AT provision as well as the problems that result from poor AT provision in PNG.
- The important role of PNG and these Guidelines in contributing to the international AT context.



2.1 PNG Government

Commitments: The right to assistive technology

The United Nations Convention on the Rights of Persons with Disabilities (CRPD) [1] is an international law that applies existing human rights specifically to persons with disabilities. As a States Party to the CRPD, PNG has made a commitment to promote, protect and ensure full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity.

For many persons with disabilities, access to appropriate AT is a precondition to enjoying equal opportunities and rights, and for participating and being included in community life. The PNG Government has recognised this in existing national and sectoral policies and plans, in particular, the National Policy on Disability 2015-2025 [2] and *National Health*

Service Standards for Papua New Guinea 2011-2020 [3]. The national policy in particular directs that guidelines for all AT be developed to ensure that appropriate quality AT are provided to persons with disabilities in PNG. These Guidelines are the first step to achieving this priority and ensuring AT provision realises the rights of persons with disabilities.

The PNG Government has also committed to many regional and international frameworks and action plans focused on promoting, protecting and ensuring the rights of Papua New Guinean citizens with disabilities. These international public declarations by the PNG Government show its commitment to its citizens with disabilities.

Table 2.1 below lists existing national legislation, policies, plans and commitments that focus on improved AT provision and therefore are supported by these Guidelines. The national, regional and international documents are described in more detail in Annex 2.

Table 2.1: Key legislation, policies, plans and commitments supported by these Guidelines

| Legislation | Sector policies and plans | Regional and International Frameworks | National Plans | Civil society strategies |
|--|--|---|---|--|
| National Constitution UN Convention on the Rights of Persons with Disabilities (CRPD) Proposed new Disability Authority Act National Health Administration Act 1997 | PNG National Health Plan 2011-2020 (also refer to NEC Directive 100/2015) National Health Service Standards PNG Community Based Rehabilitation Network Strategy and Action Plan 2013-2016 National Eye Plan PNG 2013-2016 Special Education Policy | Transforming our World: The 2030 Agenda for Sustainable Development Pacific Disability Rights Framework 2016-2025 Incheon Strategy to “Make the Right Real” for persons with disabilities in Asia and the Pacific WHO global disability action plan 2014–2021: Better health for all people with disability WHO Community Based Rehabilitation Matrix | Vision 2050 PNG Development Strategic Plan 2010-30 National Public Service Gender Equality and Social Inclusion (GESI) Policy National Policy on Disability 2015-25 (also refer to NEC Directive 100/2015) | PNG National Advocacy Plan for Disability (2015 draft), led by PNG Assembly of Disabled Persons NBDP Strategic Plan (2015-2020 draft) |



2.2 Why is assistive technology important?

There are many different reasons why a person needs and can benefit from AT. Some important reasons are that AT helps reduce the impact of impairment, and helps AT users carry out their daily activities and be an active part of community life.

Having AT that suits the needs and lifestyle of each individual means that they are more likely to go to school, to work, attend church, spend time with their friends, and be part of the many cultural, sporting and community activities available.

Recent studies have found that appropriate AT can help break the cycle of disability and poverty often experienced by persons with disabilities and their families [4] [5] [6].

For children, having AT “has been found to be the first step for any next steps: for a child with a disability to play with other children; go to school and be educated; and to become a successful citizen and contributing member of society” [7]. Having AT at the right time in their development can help a child flourish, maximise their abilities, prevent problems that may otherwise arise and can be a key factor that determines whether a child enjoys their rights or is deprived of them.

“There are no devices at the moment. All the hearing aids that are used are all not working and students have stopped using them. The students are capable of doing well in school but due to the problems they face with their devices they are unable to progress well.”

Ms Hazel Iarume, Inclusive Education Teacher, Deaf Unit, Faniufa Primary School, Goroka

For older people having AT is key to increasing their function, participation in daily living and employment, as well as improving health and wellbeing [5].

Important activities: what people think

During the development of these Guidelines, an online survey was carried out, based on work done for the WHO to understand the priorities for AT in Western Pacific countries [8].

The survey asked people to rate (from 0–4) and then prioritise activities that are part of a full life. Nineteen people from PNG completed the survey, of which fourteen had a disability. Slightly more men than women responded, most were middle aged (25–60), and they came from across the country, including nine from the National Capital District.

All activities were rated higher than 2. Moving about the community and being able to read were rated highest, followed closely by being able to dress, communicate and go to school/work. When asked to order activities from most important to least, most respondents selected being able to be clean (wash, toilet etc.) as the top priority followed by being able to get dressed.

This shows that while getting about the community and reading is important, respondents felt this could not happen unless a person can get clean, go to the toilet or get dressed. This is similar to the findings of the broader Western Pacific survey done for WHO, and shows the importance of having a range of AT available to enable persons with disabilities to carry out their daily activities and participate in community life.



2.3 How many people in PNG need Assistive Technology?

The PNG National Disability Policy 2015-2025 reports that, based on existing data in the 2009/10 Household Income and Expenditure Survey, 9.8 per cent of the population have some form of mobility difficulty. It also noted that if data was also collected on other impairments such as intellectual, psychosocial, vision, and hearing impairments then the total population of persons with disabilities in PNG would match or exceed the World Report on Disability [4] global estimate of 15% of any population having a disability.

The 2011 census [9] reports the population in PNG as 7,275,324 million people. The population is expected to grow at a rate of 3.1 per cent per year. Using the Census data and the World Report on Disability statistics, there is likely to be about 1,091,299 persons with disabilities living in PNG. The number of people who would benefit from AT is also expected to rise due to ageing, increasing incidences of chronic non-communicable diseases such as diabetes, stroke and cancer as well as injuries caused by environmental factors such as natural disasters, climate change, road traffic accidents and conflict [4].

The majority of persons with disabilities will need AT during their life [4]. For some, this may be a simple, low-cost AT (for example a magnifier). However, many persons with disabilities are likely to need more than one type of AT at one time. For example, a person with a vision impairment may use a white cane for mobility, a number of different AT to help them carry out daily activities, and software on their phone or computer to help them do their work tasks easily.

AT needs replacement over time, which means that it is not 'once only' provision. For example, AT such as wheelchairs wear out when used full time and over rough terrain. They may need replacing every 2-3 years. Children may require wheelchairs replaced more often as they grow and their needs change.

Using a variety of AT throughout life: Conchitta's story



Conchitta is 29 years old. She is from Madang and lives in Goroka. She loves singing and playing the guitar, is married and has a young son. When

Conchitta was a child, her parents took her to Madang Eye Clinic. After an eye assessment the clinic confirmed she had vision impairment.

Conchitta's parents enrolled her into Mt Sion Centre for the Blind and Faniufa Sacred Heart Primary School in Goroka. Conchitta now works full time as a cuppa for Monpi Coffee Exports.

Conchitta has used a range of AT in her life. At school she learnt to use braille and a mobility cane. She has some vision so she also learnt to write with a pen. *"It was easy to study at school because the Brothers and teachers were helpful. Sometimes a classmate would sit with me and read what was on the board".* At school, she also used a braille machine and a magnifying glass. She says: *"the lens was not right for me.. it was hard to read all the writing. A zoom lens and JAWS software would have been better."*

Now Conchitta uses an iPad mobile digital device, set for big font and pictures. She would like to learn more about how to use the iPad so she can do all of her work easily. Her employers also provide written material in big font for her.

Conchitta says other AT would also be helpful such as sunglasses for bright days to stop things getting blurry; a white cane for the blurry days to help her move around; and a laptop with JAWS software so she can continue to study and do more at work such as entering data.

2.4 Barriers to accessing Assistive Technology

2.4.1 *Equitable Access Research*

In many developing countries only 5-15% of people who need AT have access to AT [10]. This leaves a large population without the AT they need to participate equally in society.

An Equitable Access Research project [11] carried out under the PNG Access to Mobility Project (2012-2014) found similar results to those published in global studies. In particular, the Research identified that some groups of people in PNG find it harder to access mobility devices than others.

The Equitable Access Research confirmed that women and the older people were less likely to be able to access a mobility device than men.

This Research also identified that children depend on their family to be able to access mobility device services. Where a family is loving and caring for their child, there is a greater chance that the child will be able to access services. Even so, specialist services that focus on the particular rights and needs of children are difficult to access.

People living further from AT service locations also experience difficulties accessing AT. The Research found that the majority of participants who had never used a mobility device were living in the provinces, and that 87% of people who had never used a device had never been offered one.

Stakeholders who contributed to these Guidelines stated that the Equitable Access Research findings were relevant to the experiences of people who need other AT such as hearing and low vision technologies.

Ageing populations

While ageing is a success story for countries because it indicates improvements in healthcare, the number of people aged over 60 years globally is growing faster than any other age group.

The number of older people is expected to increase to one in five people, or 2 billion people, by 2050 [12,13].

Many people over 60 years are likely to need some form of long-term support, including access to appropriate AT as they age [13] [14].

In the Pacific, the number of people with impairments in this age group is likely to increase rapidly due to high incidence of non-communicable diseases. A PNG study by Dr Garap conducted in 2005 [15] found that in the population of people over the age of 50 in PNG, 29.2 per cent had vision impairment and 8.9 per cent had functional blindness.

This highlights that more and more people in PNG are likely to benefit from AT in their life time to help increase their function and participation in daily activities and help improve their health and wellbeing [5].

2.4.2 *Common barriers to AT in PNG*

In PNG, persons with disabilities may connect with many informal and formal supports, services and resources during their life. The type, quality and consistency of these relationships may be good or bad depending on factors that include age, type of impairment, where they live, who they live with, what services and supports are around and community attitudes.

The PNG Equitable Access Research [11] and consultations for these Guidelines found that some common barriers experienced by persons with disabilities accessing AT and AT services.

These barriers can be organised in four areas: systemic; environmental; practical and sociocultural.



Systemic barriers: Many stakeholders stated that not having legislation, policies, standards and guidelines that promote and guide effective AT provision makes it difficult to ensure good quality, consistent and accessible AT services.

Stakeholders identified problems with the way AT has been coordinated, procured. They recommend that these problems are avoided in the future:

- Donation or provision of AT without consulting local users and service providers
- Donation or provision of AT outside of a service delivery system and without trained personnel
- A lack of, or limited information available about the right to AT, the need for AT, and what AT services are available
- Not enough funding for AT and not enough services and trained personnel to safely provide this AT
- High demands on specialist AT service personnel to implement additional projects; particularly where this requires them to travel away from service centres, leaving local users without access to AT services
- A lack of repair centres, trained clinicians and technicians, materials and spare parts, which is associated with not having services in place to support AT.

“Often donors don’t think about the needs of local users. In some cases, equipment suitable for rural areas is still sitting in a store in the urban area. Some wheelchairs are inadequate quality for PNG needs, or the wrong size, crutches are too tall. Would have been better to go out and assess what was needed before ordering. Maintenance and repairs is often overlooked.”

PNG Stakeholder, Guidelines Consultations 2015

Environmental barriers: Many stakeholders highlighted that the environment around them is inaccessible and creates a barrier for persons with disabilities every day, including their ability to get to the services they needed.

Far distances people need to travel to reach services, inaccessible roads and buildings, as well as limited or no accessible transport and security concerns all making accessing AT more difficult.

Practical barriers: Some practical barriers to accessing AT reported by people with disabilities include that they and their families were not aware that AT can reduce the impact of their impairments and enable them to carry out the activities they would like to do. They were also not aware of services available, how to access them, what stock was available or that they need to inform the AT service if there is a problem with their AT.

This lack of knowledge results in people with disabilities not creating the demand for AT service delivery.

Other practical barriers reported include not having enough money to pay for AT, or travel to an AT service; safety and security for persons with disabilities (particularly women) and their families travelling to services; as well as security for personnel travelling to rural and remote villages to provide AT services.

Sociocultural barriers: Stakeholders reported that negative attitudes and cultural factors were barriers to accessing and using AT. The kin system is a traditional form of social support in PNG. However, in the Equitable Access Research [11] people across all age groups said a lack of family support was a key reason that they did not have AT and services they needed to participate in community life.

“Students only use the hearing aids during school and church and not in public because they are too shy to wear hearing aids in public places”

Ms Hazel Iarume, Inclusive Education Teacher, Deaf Unit, Faniufa Primary School, Goroka

Consultations for these Guidelines supported this. Many people said the kin system either enabled or presented a barrier to accessing AT. For example, the family and community sometimes support persons with disabilities by taking them to a service provider. However the kin system can also be a barrier as families keep family members with a disability hidden from others or take their AT away.



2.4.3 Specific age and gender barriers

The Equitable Access Research highlighted that women experienced additional barriers in accessing mobility devices, relating to their safety and violence towards them.

Children from 0-17 years also experienced additional barriers because they rely and depend on others to access AT.

Those aged over 50 years said that their physical limitations as well as the attitude that older people are not valued community members added to the barriers that they experience every day.

While there are many barriers, the Research and consultations also identified factors that helped men and children access AT. Men and children are often prioritised because of either their sex or their age; men are strong, confident and seen in the community and therefore given more opportunities; and children have supportive families and communities around them. Research participants identified no facilitators that enabled women to access AT.

This highlights the urgent need to address age and gender differences in AT provision in PNG.

2.5 Problems that can happen when AT is not well provided

The provision of poor quality, inappropriate AT and/or the provision of AT in the absence of a service delivery system can create problems for persons with a disability as well as unnecessary costs [16].

Problems include:

- Abandonment
- Lack of participation
- Physical harm to the user
- Environmental waste

Abandonment: Users of AT are likely to stop using AT when it does not meet their needs. Research has shown that this can be caused by a number of factors including lack of involvement of the user in the AT selection, the AT not working well, unreliable AT, difficulty using the AT, a lack of repair services and poor choice of AT for the environment in which a person lives [4] [17] [11].

Abandonment can be reduced by selecting the most appropriate AT, making sure users are actively involved in their AT service delivery, providing users (and their families) with training and support to use and maintain their AT and taking into account the various environments in which the person carries out their daily living.



Illustration from WHO WSTP

“People use them (AT) but then they use them for a short time and throw it out when spoils. One house has a whole pile of wheelchairs. We need a technical person to help mend them.”

PNG Stakeholder, Guidelines Consultations 2015

Lack of participation: Poor quality, inappropriate AT, can result in a person with a disability being unable to do as much as they would otherwise be able. This can limit their ability to participate. For example, for children, inappropriate AT can severely limit their ability to attend and do well at school [18]. For adults, a lack of access to AT can reduce opportunities for employment [19].



Physical harm: Poor quality AT, or AT that has not been provided correctly can cause the user harm. For example, persons with vision impairment who are unable to access the AT they need are at greater risk of injury through falling. Similarly, a person provided with a walking aid who is not taught how to use it correctly may slip and fall and poor quality, ill-fitting wheelchairs can lead to the development of secondary complications such as pressure sores and/or postural problems [17]. This is also true for prosthetic and orthotic AT.

Environmental waste: When a person is given AT that does not fit or cannot be used in their environment, they often stop using it and dump it. There are many reports from persons with disabilities and service providers in PNG of piles of poor quality and/or donated AT lying around. This creates an unnecessary burden for governments in terms of waste management, unsafe living areas and damage to the natural environment.

“Donors provide donations in kind, a container that comes with all sorts of donated items for hospital and school but donated ones are all used ones. Some are appropriate and some are not. In donated stock the used equipment are hearing aids and wheelchairs and they are not good. Now the hospital has a container of unused ones just sitting there.”

PNG Stakeholder, Guidelines Consultations 2015

2.6 The role of PNG and the international AT context

The role that AT can play in enabling women, men, girls and boys with disabilities to participate in and contribute to society is being recognised globally [20]. Many stakeholders are showing interest and giving greater priority and resources to AT provision, particularly in low and middle income countries. PNG’s work to develop these Guidelines is one example.

PNG is one of the first countries in the region to develop Guidelines that bring together guidance on AT provision for persons with hearing, mobility and vision impairments. While these Guidelines have been influenced by the global resources and work mentioned below, now is a

very important time and opportunity for PNG to invest in implementation and monitoring of the Guidelines.

PNG data and information, good practice examples and lessons learned can help shape the way forward for AT provision globally. PNG’s experience is also important to ensure Pacific achievements and issues are reflected in the global AT movement.

A summary of international developments towards improved AT provision follows.

2.6.1 International commitment to CRPD

By 2015, 160 Governments (including PNG) had ratified/acceded the CRPD, committing them to promoting, protecting and fulfilling the rights of persons with disabilities, including their right to AT and the promotion of research and development, availability and use of new AT, including information and communications technologies, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost (Article 4: General Obligations).

2.6.2 International cooperation on AT

The GATE initiative: In 2013, during the United Nations General Assembly on Disability and Development the World Health Organization (WHO) was given the responsibility to develop and lead a global initiative to realise several CRPD articles that relate to AT provision, including International cooperation on Assistive Technology (CRPD Article 32) [20].

In 2015, WHO began the Global Cooperation on Assistive Technology (GATE). GATE brings together stakeholders across the world to: “improve access to high-quality affordable Assistive Products, responding to the call to increase access to essential, high-quality, safe, effective and affordable products” [20].



United Nations Initiatives: A number of UN Agencies are making significant contributions towards improved AT including:

- The UN Headquarters has established an Accessibility Centre that supports inclusion and enables greater participation of persons with disabilities in intergovernmental processes and meetings by providing assistive Information, Communication and Technologies (ICTs). [21].
- UNICEF together with the Global Alliance on Accessible Technologies and Environments has conducted a global survey on AT for children with disabilities, launched a joint discussion paper with WHO on AT for children with disabilities and held the first Forum on Assistive Products for children with disabilities [7].
- UNESCO launched Project F123 on accessible ICTs, to enable access to education and employment opportunities by making free and open source AT available [22].
- Victim assistance programs under the *Mine Ban Convention* and *Convention on Cluster Munitions* are also focusing on AT provision.

International and regional user groups: User groups including the International Disability Alliance, Pacific Disability Forum (of which PNG Assembly of Disabled Persons is a member), European Disability Forum, and other regional and national DPOs are advocating and demanding affordable and appropriate AT.

International development partners:

Development partners are increasing priority and resources for AT provision for disability and ageing communities. This includes the United States of America (through USAID), Australia (through Department of Foreign Affairs and Trade), Japan, European Union; and international non-government organisations such as Handicap International, Motivation International, Motivation Australia, Association for the Advancement of Assistive Technology in

Europe; as well as the private sector such as Ageing Asia Invest.

Private Sector: There have also been fast developments in ICT by the private sector, academics and innovators such as mobile phones, internet, auditory software, and captioning. Three dimensional (3D) printing is now being used to create componentry for prosthetics.

While new mainstream and AT are being developed every day, priority must be given to including persons with disabilities in the planning, development and implementation of all mainstream technology and AT to make sure the new digital age does not continue to exclude persons with disabilities. There also needs to be continued emphasis on affordable AT, to ensure that as many people as possible can benefit from them.

Model List of Priority Assistive Products:

WHO-GATE, together with stakeholders from across the world, are developing a Model List of 50 Priority Assistive Products (APL). This is in parallel to the already well established Essential Medicines List. WHO-GATE defines Priority Assistive Products as: “those products, which are appropriate, highly needed, a must/absolutely necessary to maintain or improve an individual’s functioning and health; available at a price the individual and the community/state can afford”. The APL will identify the 50 most needed AT, and help countries plan policies and programs relating to AT provision to ensure these AT are available at an affordable cost for its citizens. The APL is due to be finalised in 2016 [23,20].

AT resources: There is increasing work underway to develop tools and resources to guide effective AT provision and standards. Some of the tools and resources used to guide development of these Guidelines have been listed in Annex 3: AT Tools and Resources.



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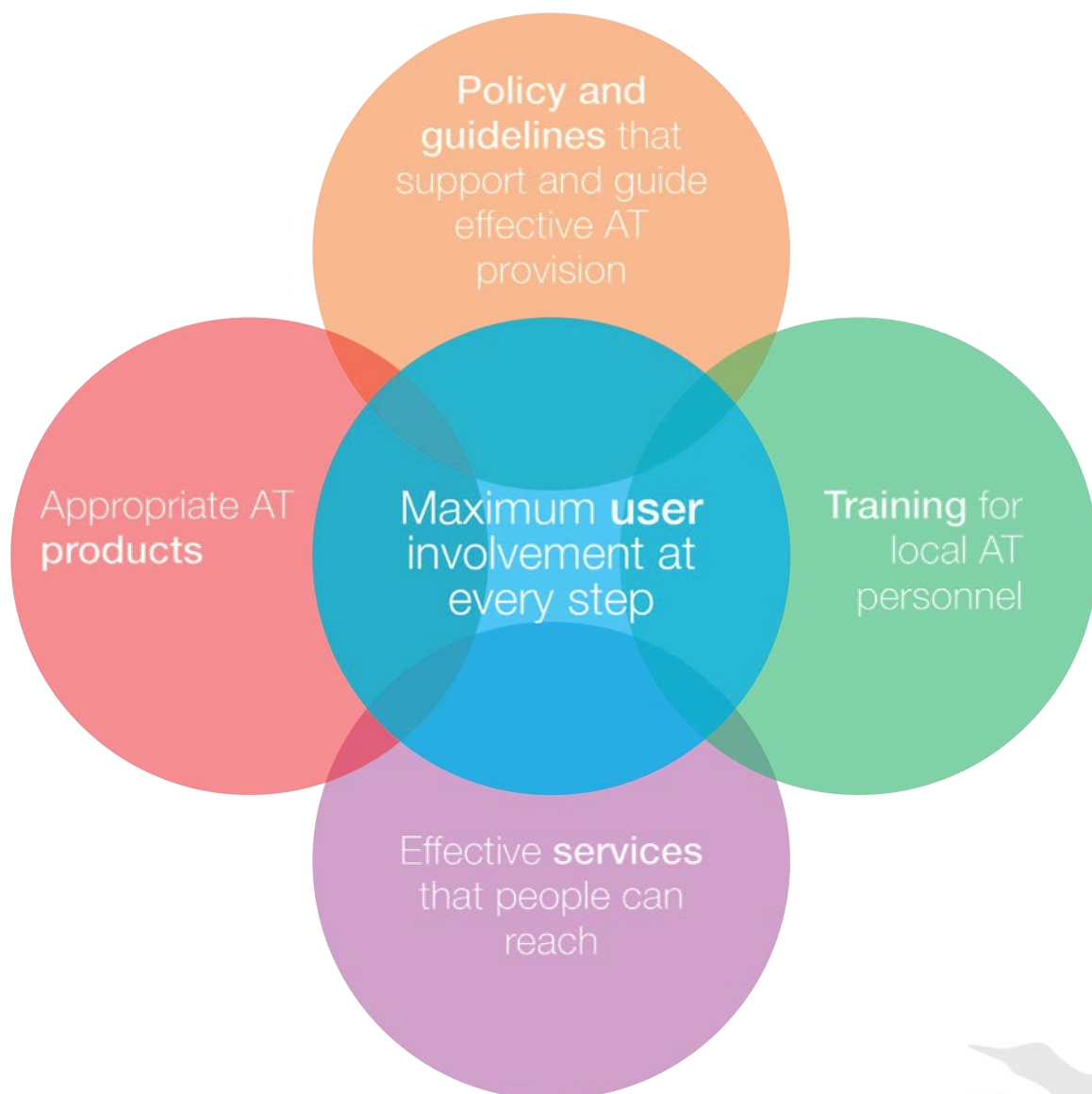


Chapter three: Effective Assistive Technology provision

This chapter discusses five key elements of effective AT Provision:

- Maximum user involvement at every step
- Policy and guidelines that support and guide effective AT provision
- Effective services that people can reach
- Training for local AT personnel
- Appropriate AT products

Chapter four expands on this chapter and suggests principles and ways to support and strengthen the effectiveness of AT provision across PNG as recommended by PNG stakeholders.



3.1 Maximum user involvement at every step

Persons with disabilities, their families and caregivers, are in the best position to make decisions that affect their lives. They live their experience every day and have the information that will help all stakeholders provide the most effective AT services for them.

While users of AT all have in common the need for AT, they are a diverse group of girls, boys, women and men, living in different parts of PNG, with different impairments, different levels of support around them, different lifestyles, life roles, life dreams and socio-economic status.

Effective AT provision requires an approach that respects the individual differences of persons with disabilities, their families and caregivers.

Effective AT provision also requires an emphasis on the right of persons with disabilities to be informed about, contribute to, participate in, be included in and make decisions about their AT and AT provision at every step of the service delivery cycle, as required by the CRPD.



3.2 Policy/guidelines that support and guide effective AT provision

During consultations for these Guidelines, stakeholders noted some of the problems that arise when there is in-sufficient policy and/or guidelines to support effective AT provision. Some of these problems are noted in Chapter two.

Stakeholders recognise that Government level policies and guidelines can support improvements in the quality of AT that is procured for PNG citizens, the minimum standards expected of AT service providers and minimum training requirements of AT service personnel.

These Guidelines, developed by and for PNG people, are a first step towards supporting and guiding effective AT provision in PNG. They have been written in the context of existing related PNG legislation, policies and plans as well as drawing on international standards and resources so that PNG stakeholders can have a resource designed around the people, places and systems of PNG.

It is the intention that as these Guidelines are implemented and as knowledge and capacities grow, they will be revised and expanded to meet the AT priorities of all persons with disabilities.



3.3 Assistive Technology service delivery

3.3.1 *The importance of AT service delivery*

No single type or size of any particular AT can meet the needs of all of the people who need that technology. The exact nature of the person's impairment, their physical needs, the activities that they want to carry out and the environment in which they live and work will affect the most appropriate choice of AT for them.

For this reason, AT must be provided through a service. The practise of handing out AT in the absence of a service and trained staff is not recommended by PNG stakeholders.

3.3.2 *Eight service delivery steps*

In PNG, an effective AT service includes each of the eight (8) service delivery steps described below and shown in Figure 3.1.

- 1. Identification, screening, and referral:** Women, men, girls and boys who need AT are identified in the community or self refer. Where appropriate, a simple screening process may be used to confirm what type of AT the user may need, and which service provider could meet their AT needs.
- 2. Assessment of the user's needs:** An assessment is carried out between a person with a disability and trained service personnel, to identify the user's needs and select the most appropriate AT from those available. Assessment includes gathering information about the user's physical needs, where they live, go to school or work and their lifestyle.

It is important the user, their family member and/or caregiver share their experiences and interests so the best possible assessment is made.
- 3. Prescription (selection):** Using the assessment information, the most appropriate AT from those available is selected. A prescription is developed with the user, family member or caregiver which details the selected AT, size, any special features or modifications and what training

the user, family member and/or caregiver may need. The user must be fully involved in choosing their AT.

- 4. Funding and ordering:** The service provider identifies how the AT will be paid for. AT may be ordered from stocks held by the service provider, government stores, from a supplier or a donor.
- 5. Preparation of the AT:** Some AT needs to be assembled (put together), fabricated (made) or adjusted for the user. Trained personnel prepare the AT for an initial fitting.
- 6. Fitting (depending on the AT):** The user tries the AT. The user gives feedback about how it feels and/or whether they notice any immediate change to their function. Final adjustments are made to make sure the AT fits the user correctly (for AT that is worn by the user) and meets their needs. If modifications are required, more fittings may be needed.
- 7. User training:** The user and where appropriate his / her family or caregiver are taught how to safely use and look after their AT. Training may also include psychosocial support such as counselling and peer support. An experienced user of the same AT may carry out training for the new user.
- 8. Follow-up, maintenance and repairs:** Follow-up appointments are important to check whether the AT is meeting user's needs, and to offer more training and support. A service ideally also offers maintenance and repairs for any problems that cannot be easily fixed at home or in the community.

If at follow up, the AT is no longer appropriate, new AT may need to be supplied, starting again from step 1.



The eight steps have been modified from the Guidelines on the Provision of Manual Wheelchairs in Less Resourced Settings [1] for the PNG context, by PNG people.

In consultations, PNG stakeholders confirmed these eight steps help define service delivery for all AT in PNG. All eight steps must be carried out for each person, for each AT that they need.

Not all service delivery steps are carried out by the same organisation. Identification, screening and referral can be, and need to be, carried out by a wide network of organisations in order to

ensure that as many people as possible are aware of their right to AT, the availability of AT and are able to access the AT they need.

Assessment, prescription, preparation, fitting and user training is usually carried out by an AT service provider. Follow up, maintenance and repairs can often be managed in the community by trained personnel, as well as by the AT service provider.

Figure 3.1 below shows how the eight steps are the same for both basic and intermediate service delivery (see section 3.4)

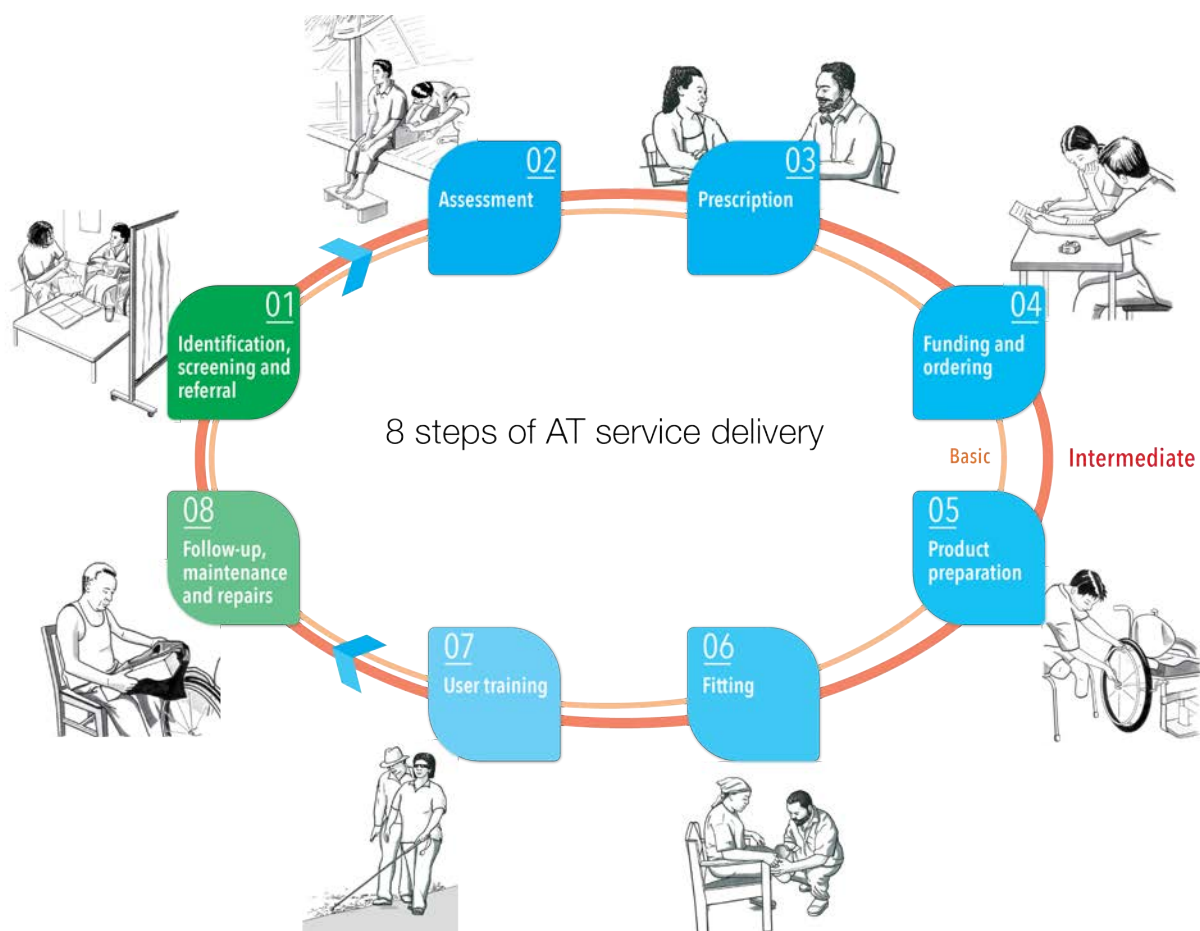


Figure 3.1: Eight steps of service delivery

The value of proper assessment: Conrad's story



Conrad is 58 years old. He is a keen fisherman who loves to swim, canoe, spend time with family and friends and go to church. As a young adult, Conrad acquired a spinal cord injury that meant he was unable to move his hands or legs.

Rehabilitation

and access to the right wheelchair for a time helped Conrad retrain his upper body to move again and enabled him to move around his village and to go to church. Ongoing exercise and swimming have helped him keep the movement he has and stop him from losing his abilities. *"I always feel lighter, I can walk to the house supported after being in the sea"* says Conrad.

When talking about his 'right' wheelchair, Conrad says *"Callan services measured me for a 3 wheeler. Assessment is a good thing because they get my size, my height and when I sit I feel comfortable. I need one (wheelchair) that's big. I need a comfortable one and a strong one to travel long distances and travel a long time with me. When I have a standard chair I can't go out to visit my brothers. I only stay at home. I want to go to church. The 3 wheeler is better, I can drive through the village and go to church, it's so much better than a standard chair. I can do more."*

When talking about maintenance and repair Conrad's says *"When I got my 3 wheeler I had also got some tools. I learnt how to operate and fix my wheelchair because I live far away from Callan Services. I want to know how to fix it myself"*. Right now, Conrad is waiting for a replacement 3-wheeler. His current chair is not a good one.

AT service delivery in action

During a school visit in a remote village a CBR Worker identifies a child having difficulty managing school work (step one). After talking with the child's parents the CBR worker understands that the child is very quiet at home and not playing with the other children. The CBR worker discusses this with the child's teacher and finds out the child cannot see the blackboard clearly and finds it hard to read. Everyone agrees to refer the child to the Special Education Resource Centre (SERC) for a vision screening.

At the SERC, a vision test (step two) is carried out with the child. The SERC personnel identify the child has low vision. The SERC then refer the child to the Eye Clinic in the nearest large town for assessment to see if spectacles may help. The child, family and CBR worker travel there by bus. At the Eye Clinic, trained personnel carry out a further assessment (step two) and confirm that the child has low vision. They explain that spectacles will help and that additional low vision AT is also needed to help the child at school and in other daily activities (step three).

The Eye Clinic provides spectacles and refers the child back to the SERC where the child is provided with a magnifying glass to assist with reading close material in class (steps four, five and six). The SERC personnel give the child, family and the CBR worker training in how to use the magnifying glass, how to look after it and keep it from getting damaged, and explain to the child and family what to do if it is lost or broken (step seven). It is agreed that the CBR worker would share the same information with the child's teacher. A follow up appointment is made, so that the child can be re-assessed in six month's time (step eight).



3.4 Basic and intermediate AT service delivery

When planning AT service delivery, it is important to recognise that some AT is more complex to provide as there are more factors to consider. For example, a wheelchair user with more complicated posture needs, will need a wheelchair with more postural support. This will take longer to provide, more tools and equipment and personnel with more training.

During consultations for these Guidelines, stakeholders agreed that AT service delivery could be described as:

- Basic (less complex)
- Intermediate (more complex).

Defining 'basic' and 'intermediate' levels of AT service delivery helps make clear the level of training required of personnel, and the standard of service delivery expected of service providers. It may also help to develop more efficient AT service delivery; as more basic AT services can be developed (utilising personnel with less training), freeing up more specialist personnel to carry out intermediate or higher level service delivery.

Basic AT services deliver AT:

- To users whose needs are less complex
- Through personnel with basic level training
- That is less complicated and requires less tools and equipment to provide.

Intermediate AT services deliver AT:

- To users whose needs are more complex
- Through personnel with intermediate level training
- That is more complicated and requires more tools and equipment to provide.

Figure 3.2 illustrates the increased complexity between basic and intermediate service delivery levels. Throughout these Guidelines, the use of the terms 'basic service delivery' and 'intermediate service delivery' are used. In Chapters five, six and seven the recommended short list of AT products and recommended training for personnel to provide these products are divided into basic and intermediate.

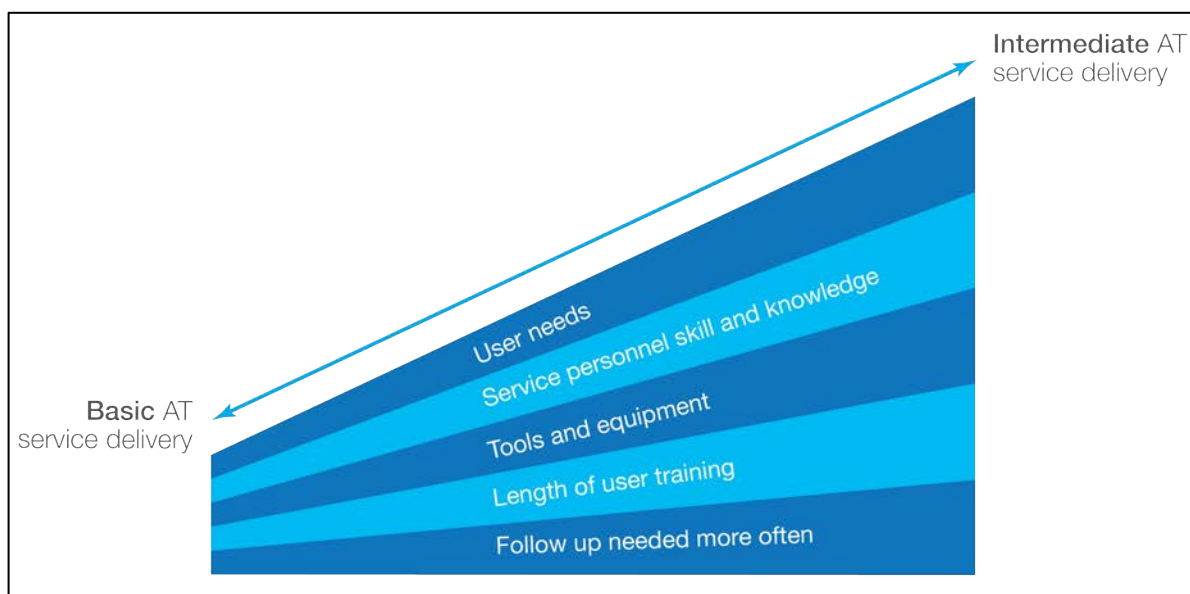


Figure 3.2: Factors that affect whether AT should be provided at basic or intermediate level

3.5 AT service tools and facilities

Personnel also need tools and facilities and to carry out their role.

For example, personnel providing prosthetic limbs need a prosthetic workshop, components, materials and tools in good working condition. Personnel providing hearing aids or spectacles need a clean space to work in, components, materials and tools to assemble and repair hearing aids or spectacles. Personnel providing computer audio software technologies for people with vision impairment need access to the software licences and computers to install it and train users.

More information on the AT service facilities required for different AT can be found in chapters five, six and seven.

In addition to tools and facilities, AT personnel also need access to the phone, email and the internet. Lack of access to these communication methods was identified as a challenge for service delivery during consultations for these Guidelines.

AT personnel need telephone, email and internet access – either directly or through administration personnel. The phone is needed to make appointments or to refer to other services, to order AT, follow up with users, invite users to user training sessions.

Access to email and internet is also important to upload data about AT users and the impact of AT on their lives, to place orders for AT, to access up-to-date information about new AT that may be available and to share PNG's experiences of various AT that have been tested.

3.6 Training for local AT personnel

Service personnel include staff and volunteers who carry out the different roles in AT service delivery.



Illustration from WHO WSTP

Many personnel can be involved in step one (identification, screening and referral) of the service delivery steps. Persons with disabilities, family members, government and non-government health, rehabilitation, education and community development workers or volunteers, and disability self-help groups all play a role in helping to identify and refer those who need AT. Personnel with additional training may carry out screening.

Steps two to eight are carried out by trained clinical and technical personnel. The minimum training recommended for each category of AT is described in chapters five, six and seven of these Guidelines.

Managers play an important role in supporting all personnel involved to carry out their duties. This includes making sure personnel have the necessary training, have time to carry out AT service delivery, have the tools, equipment and space they need and capacity to maintain a high standard of service delivery.

To increase access to AT, more trained personnel are needed at more service delivery location



Peer-to-peer training: Desmond's story



Desmond is 45 years old. He is an Inclusive Education Teacher at the Creative Self Help Centre (CSHC) in Madang. He has a vision impairment that he acquired when he was 22

years. At CSHC he teaches braille, mobility and tactile skills, peer-to-peer training and counseling. He also supports the CBR program.

Desmond says *"It was a total new life experience to live in darkness. No one in my family or community was blind before and could share their experience with me. I was shattered and confused and contemplating suicide. I asked for God's Grace. When I got blind I had never used a white cane and someone had to tell me how to use it. The person giving a device has to explain the success story of using it so it wins me and creates and motivates me. Then I saw Ben Theodore using a white cane. He asked my room number. I said room 15 and he said he will lead me to room 15, he knew the bearings of the hotel. Then I was watching him use the rhythm pattern. Ben saw a post and counted three doors and then said that's your room and it was. With Ben leading me to the room I got a lot of empowerment. Ben did a very good demonstration and made me think he already had some sight. That was the launch pad for me."*

"Peer to peer transfer of skill is very effective. Another blind person sharing experience with another blind person is very powerful. It is the beginning of a lot of strength and guidance. If you want a quick result bring in a lot of role models. Let them talk away like a TV talk show, and then you will see inroads into their lives and they will transfer skills and knowledge."

3.7 Assistive Technology products

3.7.1 Where AT comes from

The majority of AT used in PNG has been designed in other countries and is imported. In some cases AT is assembled locally from imported components and materials. Some AT is made locally. For example:

- Hearing aids are imported, and then adjusted for users by trained personnel.
- Prosthetic legs are assembled for each individual user by trained prosthetists using imported components and materials.
- Users and/or their families may hand-craft AT such as a walking stick or reading stand.

As much of the AT used in PNG is imported, the high cost of clearing imported goods is a challenge.

3.7.2 Transporting AT around PNG

Stakeholders report that AT is mostly available around urban centres such as Port Moresby, Lae and Madang. The cost of transporting AT to a network of service delivery locations is a challenge, and makes access to AT for people living outside of main urban centres more difficult. This is a greater issue for larger AT such as wheelchairs.

3.7.3 Standards for AT

The International Standards Organization (ISO) is responsible for developing international standards for many things including AT (See Annex 4.) There are different ISO standards which apply to different AT. However, ISO standards are written to be relevant globally. This means they do not contain aspects specifically relevant to a particular region or country. For example, ISO standards do not address requirements of a product to be 'durable over rough ground'; or 'continue to function in humid conditions'. This is because 'rough ground' or 'humid conditions' are not found everywhere.



To ensure products are appropriate to the context in which they are used, some regions and many countries use ISO standards to develop more specific requirements relating specifically to their context.

PNG has not as yet developed specific AT standards. However, the use in PNG of AT that has been designed and tested outside of the country means that it is important to:

- Be aware of what ISO or other international standards are applicable to which AT
- Be aware of which standards individual models of AT have passed
- Assess the suitability of AT for the context in PNG when procuring AT

3.7.4 *Selecting and procuring appropriate AT*

Assessing the suitability of AT for use in PNG includes thinking about the impact of local factors on the AT and how it will be used. Local factors include climate, terrain, housing, access to replacement parts, ease of repair, training of service provider personnel and opportunities for follow up and support for those who use the AT. The cost of AT is another important factor for PNG. However, experience in PNG has shown that poor quality products (often the least expensive) may break down quickly, and therefore do not represent value for money.

These Guidelines are a first step in defining appropriate AT for the PNG context. However, further research and evidence is needed as stakeholder capacity and knowledge grows. PNG stakeholders also need to take into account the rapid growth in AT technology, including more affordable AT designed to meet an increasingly recognised need in low income countries.

Making cost-effective, equitable and appropriate AT procurement choices requires:

- Reliable and current information about the most appropriate AT available
- Personnel with sufficient technical knowledge
- Knowledge of supplier options
- Well governed procurement systems that are clear to everyone.



3.8 References

- [1] World Health Organization, *Guidelines on the provision of manual wheelchairs in less resourced settings*. Geneva, Switzerland: WHO Press, 2008.



Chapter four: Strengthening AT Provision in PNG

This chapter outlines:

- The key responsibilities of PNG stakeholders in implementing these Guidelines; and
- Guiding principles for AT provision in PNG towards:
 - Recognising rights
 - AT services that reach those who need them
 - Training of Papua New Guinean personnel
 - Making recommended AT available
 - Procuring quality AT
 - Monitoring, evaluating and assess the impact of AT service delivery
- Strategies for all stakeholders to strengthen AT provision towards these principles in the short, medium and long term.



4.1 Who is responsible for AT provision in PNG?

AT provision requires the partnership, collaboration and coordination of many stakeholders. Table 4.1 highlights PNG stakeholders and their key responsibilities in making sure AT provision is effective.

Table 4.1: The role of key stakeholders in AT provision in PNG

| Leadership | Governance |
|---|---|
| Department of Health (DOH), Department of Education (DoE) and Department for Community Development and Religion | National Advisory Committee on Disability (NACD) |
| <p>Lead, promote and coordinate implementation of the Guidelines relative to the department's responsibilities.</p> <p>Advocate for compliance with the Guidelines across Government, including in new or amended legislation and policies.</p> <p>Use the Guidelines to inform health, education and community sector policies and service standards, including a priority AT list; and advocate for adequate budget allocation for AT provision including recommended/priority products, AT services and personnel training.</p> <p>Establish and facilitate transparent governance processes for procurement of AT that includes user and service provider participation.</p> <p>Work together to establish a simple mechanism for user and service provider feedback.</p> <p>Establish a central location of information and resources on AT provision to help identify need and show results (such as an AT Resource Centre).</p> <p>Support Certificates of Exemption of GST for those importing recommended AT that meets defined standards.</p> <p>Monitor implementation of the Guidelines, including the performance of service providers, those procuring AT, donors, and support AT research.</p> <p>Report progress and strategic issues to the NACD.</p> <p>Engage with the media to promote the Guidelines and share good practice examples.</p> | <p>Oversee and monitor compliance with the Guidelines at a National level; and guide provincial disability committees to do the same at Provincial level.</p> <p>Support stakeholders to advocate for implementation of the Guidelines.</p> <p>Have an Agenda item and receive reports on the progress of Guidelines implementation; analyse and discuss reports and include progress in National Policy on Disability reporting.</p> <p>Support AT related research and use new evidence to influence policy, legislation or service reform, human resources, other management needs, lobby for funds.</p> <p>Engage with the media to promote the Guidelines.</p> <p>DFCDR in its NACD Secretariat role, ensure the Guidelines are monitored and reported on.</p> |



| Implementation and M&E | |
|---|--|
| Provincial and Local Government Level | NBDP, Service Providers |
| <p>Work with service providers, DPOs and users to:</p> <p>Raise awareness about and advocate for use of the Guidelines</p> <p>Decide priorities for implementation</p> <p>Develop actions and costing for inclusion in annual activity or business plans, operations and procurement plans, and budgets</p> <p>Include oversight and monitoring of the Guidelines as a responsibility of the Provincial Coordinating Committees on Disability (PCCD) and government disability focal person. PCCD's role is similar to that of the NACD but at provincial level</p> | <p>Familiarise staff with the Guidelines, use and comply with them in all work.</p> <p>Establish a Code of Conduct for staff that promotes equitable and rights based services.</p> <p>Establish systems and collaborate with other services to ensure all AT service delivery steps are implemented.</p> <p>Include persons with disabilities in all decisions about their AT and service delivery.</p> <p>Establish a simple feedback system for users and families.</p> <p>Collect data and monitor implementation, conduct research, evaluate impact of AT.</p> <p>Report to DOH, DOE, DFCDR and NACD.</p> |
| PNGADP, DPOs and Users | Development Partners* |
| <p>Advocate and raise awareness about the Guidelines.</p> <p>Understand and use the Guidelines to advocate for effective AT provision.</p> <p>Give feedback and contribute to decisions about AT and AT services.</p> <p>Respect and look after AT provided.</p> <p>Ask for training in how to use and look after AT.</p> <p>Go back to the service provider for repairs or replacement.</p> <p>Conduct and/or contribute to AT research.</p> | <p>Use the Guidelines to inform programs, funding, AT donations.</p> <p>Consult with service providers, users and DPOs to identify needs before procuring/donating.</p> <p>Follow up, monitor and evaluate use of funds.</p> <p>Provide technical expertise in priority areas where needed, including training of personnel and research.</p> <p>Ensure AT is provided by trained personnel and within a service delivery system.</p> <p>Look for opportunities to make sure existing and new programs, include and are accessible to persons with disabilities.</p> |

* Development partners include: donors, private sector, international NGOs and procurers of AT



4.2 Recognise rights

Guiding principles to recognise rights

In line with the Convention on the Rights of Persons with Disabilities all stakeholders and systems of AT provision, particularly of Governments and Service Providers will:

- Recognise the right of women, men, girls and boys with a disability to affordable, appropriate AT that helps them participate equally in PNG society.
- Recognise the right of users of AT to be active participants and contributors in the provision of their AT.
- Recognise, raise and strengthen the voices of persons with disabilities so that they are an equal partner in development and in strengthening AT provision across the country.
- Support the users of AT to make informed choices about their AT including by providing accessible information about AT to the user.
- Aim to ensure equitable access to AT and services, for all PNG citizens including women, men, girls and boys; people living in rural and urban settings; older people; people who were born with or have acquired an impairment; and people from different ethnic and socio economic backgrounds.
- Recognise their obligations “to undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communication technologies, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost” (CRPD Article 4:1g).

4.2.1 At Government level

Talk about the Guidelines with Government: Disabled Persons Organisations (DPOs), users of AT and service providers can talk with governments at national, provincial, district and local levels and across all sectors about:

- The rights of people with disabilities; their right to appropriate AT to help them participate as equal citizens; and their right to play an active role in AT provision.
- The role of these Guidelines in supporting implementation of the CRPD.
- Priority areas of these Guidelines that need to be addressed in the short, medium and longer term.
- How political leaders and policy makers can support these Guidelines by promoting them, incorporating them into government policies, and allocating funding for effective AT provision.

Include the right to AT provision in Government legislation, policy and planning:

The PNG Government has plans to review its legislations and policies to comply with the CRPD. These reviews are an opportunity for the PNG Government to amend or incorporate measures for appropriate AT provision into existing or new legislation including:

- The proposed Disability Authority Act *and*
- Relevant health, education, and labour legislation and policies.

It will be important to consider compliance with these Guidelines as part of this process. National, provincial and local level governments, including provincial health authorities, can also integrate relevant aspects of these Guidelines into their operations plans, annual activity or business plans, corporate policies and budgets.



Allocate budgets for AT provision: When costing AT provision, governments at national, provincial and local levels should ensure the costs of products **and** associated services are included.

Explore sustainable funding strategies for AT: Funding strategies may include:

- Full government funding of specified AT.
- User contribution and/or payment schemes.
- Purchase or subsidy of AT through social protection and incentive programs.
- In combination with any payment schemes, it is important to develop fair, equitable and transparent eligibility criteria.

Department of Health (DOH), Department of Education (DOE) and Department for Community Development and Religion (DFCDR) work together to lead Guidelines implementation: DOH, DOE and DFCDR work together to discuss and raise awareness with other government counterparts at national, provincial and local levels about these Guidelines and how they apply to each level of Government. This may include:

- Providing training and awareness on these Guidelines as part of road shows such as inductions on the new National Policy on Disability 2015-2025.
- Inviting DPOs and users to participate in discussions to share their experiences and advocate for their rights.
- Providing advice and discussing opportunities to amend existing legislation and policies to incorporate and specifically reference the guidelines and/or a person's right to AT.
- Being clear about who, how and when the Guidelines will be reported to the National Advisory Committee on Disability (NACD).

DOH to lead in rehabilitation service

delivery: Stakeholders recommend the DOH create a team of staff to coordinate and represent the rehabilitation sector, including AT services. This team, led by a senior level position could strengthen a rights based approach to AT provision through:

- Advocating for these Guidelines at the high level as a step towards implementing the CRPD.
- Leading implementation of the Guidelines as a strategy for implementing the National Health Service Standards (NHSS) relative to persons with disabilities. This includes ensuring that service sites keep their personnel well trained and their services and equipment in good working order in line with the NHSS.
- Integrate aspects of the Guidelines into future revisions of the NHSS.
- Collecting, analysing and reporting information from the sector into the National Advisory Committee on Disability, into health sector and disability reporting processes such as the CRPD, and in the media.
- Using lessons from the sector to inform policy and program decisions.
- Work with Service Providers, DPOs, users and those procuring AT to develop a rights based Code of Conduct for rehabilitation personnel.
- Monitor service provider compliance with these Guidelines.

Seek development partner support:

PNG Government and Non-Government stakeholders can request assistance from development partners, including donors, to support implementation of these Guidelines as part of PNG's efforts to implement the CRPD. PNG stakeholders request that, as a requirement of technical or financial support, development partners ensure proposals align with these Guidelines.



4.2.2 At service provider level

Disability service providers play an important role in AT provision. Ensuring that the AT (and other) services are provided in a rights based manner is one responsibility of service providers. The following strategies can help service providers provide AT in accordance with the recognise rights guiding principles:

- Work with DPOs to train all staff on the CRPD and how to work in a rights based way.
- Make staff aware that access to AT is a mandated right of persons with disabilities.
- Make these Guidelines available for personnel and run training about them.
- Invite users of AT to talk to personnel about their experiences of service delivery and how they think that service can be improved.
 - Add relevant parts of these Guidelines into organisational policies and processes. For example:
 - Personnel position descriptions and staff performance reviews
 - Strategic plans, activity plans and budgets
 - AT procurement checklists and approval processes
 - Standard operating procedures, including the responsibility for service providers to maintain service centres and equipment in good working order.
 - Develop a simple way for users, family members and caregivers to provide feedback about their AT and services including how to respond to both positive and negative feedback;
 - Develop a Code of Conduct for staff that includes the responsibility of staff to:
 - Respect the rights of people with disabilities
 - Work in a rights based way
 - Comply with these Guidelines
 - Fully include people with disabilities, their families and/or caregivers in their AT service delivery

4.2.3 What DPOs, people with disabilities, users, families and caregivers can do

Persons with disabilities, their families and caregivers are in the best position to advocate for their rights and to make decisions that impact on their lives. They live their experience every day and can provide the most useful information about what works, what does not work and how things can be improved.

The following are some ways persons with disabilities, users, families and caregivers can be active in AT provision:

- Become familiar with these Guidelines
- Demand appropriate AT and services
- Participate in decision making about AT
- Ask for training on how to use and look after AT
- Maintain AT and attend or be available for follow up appointments
- Provide honest feedback about AT and associated services

DPOs play a key role in advocating with service providers, governments and those procuring devices to make sure they use the Guidelines to guide their work. Annex 1 provides more details on this role. DPOs and single disability line agencies can also:

- Provide members with information about these Guidelines, and support them to implement the strategies listed above.
- Work with other stakeholders to deliver training on the CRPD and the Guidelines, highlighting that access to AT is a mandated right of persons with disabilities.
- Build the capacity of DPOs from national to local levels to be able to raise the voice of persons with disabilities in the development and provision of AT services.
- Provide awareness and training on human rights for persons with disabilities for government departments, in particular DOH, DOE and DFCDR.



- Build in advocacy strategies for effective AT provision into the PNG National Advocacy Strategy.
- Hold DoH, DOE and other service providers accountable through forming a group of allies to push for the Guidelines to be implemented, monitored and reported on.

4.2.4 At development partner level

Under CRPD Article 32 on international cooperation, development partners, including donors, private sector and procurers of AT, have an obligation to ensure that international development programs are inclusive of and accessible to persons with disabilities. This obligation also includes providing appropriate technical and economical assistance that helps facilitate access to appropriate AT.

PNG stakeholders request that development partners:

- Become familiar with these Guidelines and use these Guidelines to guide technical, economical and procurement assistance.
- Support demand driven AT and AT services by consulting with service providers, DPOs and local users about the AT that is required and that is appropriate in the PNG context.
- Ensure that users participate in all aspects of AT provision, and in development programs more broadly.
- Ensure any assistance helps to strengthen or is provided through a service system by trained personnel.
- Support monitoring, evaluation and assessment of impact of AT provision in the lives of persons with disabilities.



4.3 Assistive Technology services that reach those who need them

Guiding principles

Governments, service providers, donors, DPOs and users will ensure that:

- All AT will be provided through services by personnel that have received a minimum, defined level of training in the relevant AT service delivery.
- AT service delivery includes all eight (8) steps outlined in Chapter 3, even if different organisations or service providers carry out different steps within the service delivery cycle.
- All stakeholders understand their roles and responsibilities within the service delivery cycle.
- All stakeholders will consult with DPOs, including single disability line agencies, persons with disabilities, their families and carers in the ongoing development and improvement of AT services.

4.3.1 Strengthen the capacity of many organisations to carry out awareness raising, identification, screening and referral (the first step of AT service delivery)

Many organisations and services play a role in the first step in AT service delivery. This includes government and non-government health, rehabilitation, education (including early childhood and care centres) and faith based organisations as well as disabled person's organisations and self help groups.

Improving capacity in the first step of service delivery can also assist the early identification of persons with disabilities. This is often particularly important for children. Early identification and referral can assist girls and boys with disabilities, their families and caregivers get the services and supports they need to exercise their rights from an early age. This can set them up for greater access to opportunities over their lifetime such as education, employment, and community participation.

AT service providers can increase the capacity of other organisations to raise awareness, identify, screen and refer by:

- Providing clear information about the AT services they provide
- Clarifying who provides which service and where at national, provincial and local level
- Explaining how to refer
- Making referral systems simple

- Where appropriate, providing training for managers, staff and volunteers of referral organisations on how to carry out screening (such as ear and eye health screening)

4.3.2 Increase the number and spread of AT service providers

Increasing the number of organisations carrying out AT service delivery requires Government commitment and investment; and stakeholder collaboration. Some cost effective ways to increase both the number of services and develop a more even spread of services across PNG are described below.

Support community organisations to provide basic AT. For example:

- Train and support disabled people's organisations, self-help groups and faith based organisations to provide basic AT such as walking aids, and/or to carry out aspects of service delivery such as user training, follow up, repair and maintenance.

Integrate basic AT service delivery into existing mainstream health, rehabilitation, education and disability services. For example:

- Train nurses at community health posts to provide basic AT such as walking aids.
- Expand the AT provided through health centres, community health posts and eye clinics to include optical and non-optical vision AT as well as spectacles.



- Support physiotherapy departments and community based rehabilitation services in providing basic AT by providing any additional training for personnel, necessary tools and equipment and (depending on the AT) supporting clinical personnel with AT technicians.

Strengthen existing specialist AT service providers and increase the number of their service sites. Some of these organisations include (and are not limited to):

- The National Orthotics and Prosthetics Service (NOPS) which provides mobility AT
- The Network of Callan Services for Persons with Disabilities, which provides hearing and vision AT
- Eye Clinics and PNG Eye Care which provide vision AT

A number of these existing AT service providers are based at provincial hospitals. Utilising provincial hospitals as a hub for intermediate level AT services is a model that would ideally be expanded across PNG.

4.3.3 Improve coordination between service providers

Not all eight (8) service delivery steps need to be carried out by one service provider. Service providers can work together to ensure all steps are covered for each individual. For example, a person who receives a prosthetic limb through NOPS, may have help managing simple repairs from a trained CBR worker employed by another organisation.

- Agree on clear roles and responsibilities of each organisation across the eight (8) steps of service delivery to help ensure the eight (8) steps are covered.
- Formal agreements such as a Memorandum of Understanding between service providers working together in this way will help each organisation identify and commit the necessary resources.

4.3.4 Establish effective strategies to ensure follow-up

Follow up is an important step in service delivery. Sometimes simple help from trained personnel can help the user make better use of

their AT as well as identify problems. Follow up helps to avoid harm that can be caused when AT does not fit, is broken or is used incorrectly. For example, follow up can identify that a pressure relief cushion needs replacing, rubber tips on a walking aid are worn out, or if hearing aid batteries are flat.

However, follow up is often one of the most difficult service steps for service providers to carry out. Challenges include not enough personnel, managing follow up appointments, travel logistics for AT users or personnel, lack of accommodation options for personnel in remote areas, and the security and safety of personnel carrying out follow up in the community.

Ways to improve follow up include:

- Explain the benefits of follow up to policy makers, AT service provider managers, personnel, users and funders to increase everyone's efforts to support follow up.
- Include costs for transport, accommodation and security of personnel for follow up visits in budgets and funding proposals so that follow up is adequately resourced.
- Support AT service providers to include follow up in their systems and procedures.
- Support AT service providers to collaborate with and train community organisations to carry out those aspects of follow up that can be readily carried out at community level.

4.3.5 Adequately resource AT service providers and personnel

As noted in Chapter three, AT services and their personnel require facilities, tools, equipment and access to communication (telephone, email, internet) to work effectively.



How a lack of resources limits service delivery: What stakeholders say

During the Guidelines consultations, PNG service providers highlighted how important adequate financial and human resources are for AT provision. They also shared experiences about how a lack of resources impacts on the lives of persons with disabilities.

- “We used to receive funding to cover the costs of Community Based Rehabilitation (CBR) workers but the funding was stopped. We used to have four CBR staff and now have only one volunteer. The others left to find other jobs because they need to live.”
- “Our student enrolment number just dropped because of the distance to school, lack of transport and no CBR field officers. Some students live with relatives and not enough families care to send their children to school. Most students are coming from broken homes. Their parents are illiterate and can't afford to pay for the transport and here we are short of field officers to reach them.”
- “The Inclusive Education and CBR programs are partners. Most programs have been done by CBR and they refer to Special Education and now Inclusive Education are there but how do we get people referred to CBR for devices when the service is not there? We only have one volunteer.”
- “We are trying to deliver AT to people to make life better, help them move around and bring them into education. Most of them (students) are coming from families who received information at a late stage in life and they expect us to make a miracle. Their (students) actual life is poor, they are in poverty and neglected. Government needs to play a role to look after them”
- “We have limited devices, CBR workers go out for screening and often can't give out devices because we don't have any.”
- “We need multiple skills in each person so that we have more resources to go out and work with people with disabilities in the community.”



4.4 Train Papua New Guinean personnel

Guiding principles

Governments, service providers, donors, DPOs and users will ensure:

- Provision and/or development of quality training and supervision for personnel providing AT, using the minimum level of training needed to safely provide the priority AT described in these Guidelines.
- Local PNG personnel are trained as a priority, to ensure sustainability.
- There are opportunities for persons with disabilities to be trained as AT personnel if they choose.
- The capacity of existing training providers and trainers in PNG is used to deliver training programs wherever possible.
- All training programs include training on the rights of persons with disabilities and how to advocate for the Guidelines.

In order to meet the need for AT in PNG through a service delivery system, increased investment in the training of AT personnel working at all stages and levels of service delivery is needed. There is potential in PNG to provide much of this training in-country, and this is strongly favoured by PNG stakeholders.

4.4.1 *Make use of these Guidelines*

These Guidelines define the minimum level of training that is needed for each category of AT, at each service delivery level. This can be used to assess existing courses delivered in PNG, to strengthen the curricula in these courses, and develop new courses. These Guidelines also summarise the eight (8) steps of service delivery for each category of AT. Training for AT personnel needs to cover their role in each of these steps.

4.4.2 *Identify lead training organisations*

There are a number of registered training organisations in PNG delivering quality impairment/disability related training. These include the Callan Studies National Institute, Fred Hollows Foundation New Zealand and Divine Word University.

In addition, some service providers have taken a lead in training personnel in the service delivery for specific AT. For example, NOPS has taken the lead in training basic level wheelchair service personnel.

Each of these organisations and others could collaborate and work together to strengthen and

develop training for AT service personnel in PNG.

4.4.3 *Training course approval and accreditation*

Approval and accreditation of clinical and technical training courses helps make sure minimum standards are met; and qualifications are appropriate to the needs and recognised by employers.

The Department of Education, the Department of Health through its Medical Board, and the Department of Labour and Industrial Relations through its National Training Council play a key role in training accreditation. It is important for these Departments to develop a system for approving and accrediting existing or new national AT service training courses.

4.4.4 *Integrate AT training into existing training programs*

Where possible, including relevant AT training into existing health, rehabilitation, education and special education training courses will result in more personnel with AT training. Some specific opportunities include:

- Include information and skills in identifying, screening and referring persons with disabilities who need AT into all CBR, community health worker and community development officer training.



- Build on Callan Services National Unit's existing training on ear health and hearing to expand the number of personnel trained in hearing AT provision across the country.
- NOPS and the Divine Word University may collaborate to integrate the WHO Basic and Intermediate Wheelchair Service Provision Training Packages into physiotherapy and CBR training programs.
- Integrate the PNG Walking Aids Training Package into physiotherapy, CBR, nursing and other relevant training courses.
- Re-introduce a Certificate of Eye Care course through an existing training institution to train more personnel to carry out eye examinations, prescribe ready-made glasses and refer to more specialised services where needed.
- Develop and include training on low vision AT into primary eye care worker, ophthalmic clinical specialists, community health worker and special education teacher training courses.
- Include training on AT service management that equips personnel, especially management staff, with skills and understanding in AT service management, supply chains, stock procurement and management, AT budgeting and forecasting, monitoring and evaluation.
- Develop and include training on AT use and maintenance, supporting an AT user as well as occupational health and safety for families and caregivers into upcoming caregiver training programs.

4.4.5 Make sure training is practical and accessible

PNG Stakeholders recommend a number of strategies to make sure that training is practical and as widely accessible as possible. These include:

- Develop short course training modules that build on each other and can be delivered in a flexible way. For example, personnel already working may undertake modules in 2-3 week blocks, during the year.

- Make sure the content of training programs is specific to PNG people and their context.
- Incorporate practical learning assignments for trainees to carry out between modules to build experience and competency.
- Support personnel already providing AT and not yet formally trained, to participate in formal training.
- Make training accessible for persons with disabilities by providing the necessary reasonable accommodations. For example, adapt material (e.g. Braille, audio or larger print), provide sign interpretation, ensure training is delivered in accessible locations and support lecturers to be able to train using accessible teaching and learning methods.

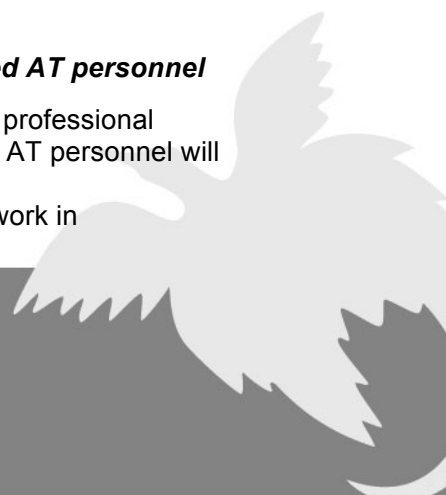
4.4.6 Train technicians

While there is a need for an increase in all AT trained personnel, it is important to ensure that the ratio of clinical and technical personnel is managed. Technicians play an important role in AT service delivery and allow for a more efficient service. For example, technical staff can make and/or assemble, maintain and repair AT locally such as wheelchairs, hearing aids, spectacles and braille and audio computer software.

Ensuring sufficient opportunities for training of technical personnel is necessary for improving access to and sustainability of AT services in PNG. It is important that training providers delivering technician training have agreed and consistent competencies for assembly, modification, maintenance and repair of AT as well as checking the quality and safety of the AT as per relevant standards.

4.4.7 Support trained AT personnel

Support and continued professional development of trained AT personnel will help make sure trained personnel continue to work in



AT service delivery. It will also help AT personnel provide up-to-date and quality AT services as new evidence and information about AT develops.

Support could be provided by establishing a system for professional registration of all AT personnel working in basic and intermediate AT service delivery. There is an opportunity to align with, use or strengthen existing systems such as the Medical Board or Physiotherapy Association to include AT service personnel. Professional registration would provide opportunities for recognition of AT training, structured mentoring and supervision of AT personnel; provision of refresher training; and monitoring of the quality of work carried out by AT service personnel.

4.4.8 Increase the number of AT trained personnel

AT services require trained personnel. Some ways to increase the number of trained personnel are listed here:

- Government to formalise and fund the roles and functions of CBR workers within the health care system and provide new CBR personnel with training.
- Identify and train existing personnel to carry out AT service delivery as part of their duties. For example: community health workers can provide walking aids; primary eye care workers and ophthalmic technical specialists can provide low vision AT; physiotherapists and CBR Workers can provide basic and intermediate level wheelchairs.
- Identify persons with disabilities, families and/or caregivers, coordinated through self-help groups, who are interested in receiving the necessary training to carry out aspects of service delivery.
- Encourage PNG citizens to study allied health courses such as physiotherapy,

occupational therapy, prosthetics and orthotics, and speech therapy.

- Encourage PNG citizens to study in and become AT technicians such as hearing aid, prosthetic, wheelchair, optical and non-optical technician.
- Bring in specialist trainers to deliver PNG customised AT training in PNG, where appropriate.

4.4.9 Access quality, appropriate external training where required

Some training needs cannot currently be met within PNG. This includes training for prosthetists-orthotists, occupational therapists, speech therapists and audiologists. Having more personnel in PNG with these degree level professional qualifications would be very helpful in improving both rehabilitation and AT services.

The choice of training institution to deliver these courses for PNG nationals returning to work in PNG is important. For example, prosthetics-orthotics training in some developed countries will not teach PNG nationals how to work with prosthetics components likely to be used in PNG. Chapters 4 to 6 provide some suggestions for relevant training courses.

4.4.10 Communicate PNG AT training needs to donors and international partners

PNG Stakeholders may use these Guidelines to talk to donors and international partners about the minimum level of training for AT personnel in PNG. Donors and international partners involved in training can be asked to ensure training meets the minimum standards, is delivered in the preferred practical and accessible way and covers each of the eight service delivery steps.



4.5 Make recommended AT available

Guiding principles

Government, service providers, donors and those procuring AT will:

- Work with service providers, AT users, DPOs and single disability line agencies to identify AT needs.
- Work to ensure the AT recommended by PNG stakeholders for people with hearing, mobility and vision impairment are available in PNG at an affordable cost for those who need them.
- Aim to have an appropriate range of types and sizes of priority AT available to meet the different needs of individuals.
- Ensure spare parts for AT are available in PNG for local maintenance and repair.
- Ensure AT are provided through a service delivery system.

4.5.1 Have a recommended AT List

The endorsement by the PNG Government of a Recommended AT List would assist AT procurement and help ensure the most needed AT is more readily available in PNG.

Recommended AT has been identified in these Guidelines, following consultation with PNG stakeholders and guidance from a draft World Health Organisation 'Model List of a Priority Assistive Products'. The recommended AT list in these Guidelines could be used as a basis to finalise a Government endorsed Priority AT List.

4.5.2 Establish an AT Resource Centre

The establishment of an AT resource centre for AT users, disability, health and education service providers and others could serve to significantly strengthen AT provision in PNG.

Discussion is underway in PNG in response to the National Executive Council Directive 100/2015 to develop facilities across the country for use by disability service providers. Such facilities could serve the functions of an AT resource centre. The Prevention of Blindness Committee is also establishing a National Resource Centre for Eye Health at the University of PNG in Port Moresby.

As discussions on an AT resource centre continue, it will be important for all stakeholders to collaborate, agree plans, share lessons and

resources and identify ways to build on existing centres and services, avoiding duplication.

The functions of an AT Resource Centre/s could include:

- Providing education and awareness about AT for users of AT and their families, service providers, the public.
- Stocking recommended AT for users to try out.
- Being a centralised repository of data collected by AT service providers to help inform procurement and service delivery.
- Research, for example to help refine the list of recommended AT, better understand the impact of AT, calculate cost benefits, and inform service delivery.
 - Actively supporting Government and donor procurement through:
- Maintaining a list of approved suppliers of priority AT that meet minimum requirements for use in PNG (as described in these Guidelines)
- Providing technical representation on government and donor procurement committees.



4.6 Procure quality Assistive Technology

Guiding principles

Governments, service providers, donors, DPOs and users will ensure that:

- All AT, whether imported or made locally; purchased or donated meet the strength, durability, safety and functional requirements of user's in their own environment.
- Minimum PNG specific standards for priority AT are developed, using the relevant International Standards Organisation (ISO) standards as a basis.
- The process of procurement is clear to everyone (transparent) and includes people with relevant technical expertise to make informed decisions in line with these Guidelines and more detailed standards as these become available.
- The appropriateness and use of AT are monitored to ensure AT meet individual needs, daily activities and lifestyles; to continue to inform procurement decisions; and to gather evidence to support development of PNG's own standards for AT.

4.6.1 Make use of these Guidelines

These Guidelines include information about international standards (where available) for recommended AT and procurement checklists to assist in making good procurement choices.

These checklists will assist in making sure imported and locally made AT meet the strength, durability, safety and functional requirement of user's in their own environment; and that the most commonly needed spare parts are made available.

Stakeholders may share these Guidelines and the procurement checklists with donors and or Business Houses that stock AT. Ask that donated AT, or AT stocked by Business Houses meet the required checks. Suppliers of AT can be asked to provide documented evidence that products have met relevant standards. Ensure that both donors and Business Houses understand the need for AT to be provided through a service.

Make sure those designing and/or making AT locally are trained in these Guidelines, especially the minimum product standards.

4.6.2 Reduce any import barriers

PNG stakeholders strongly recommended that the PNG Government award a Certificate of Exemption of GST to those importing AT, AT components and materials that comply with the procurement checklists.

4.6.3 Use and strengthen Government AT procurement processes

Use existing supply chains: There is significant potential for PNG to use the existing supply chains available to store and manage the logistics of transporting AT to service delivery sites.

Existing sites and systems include the Department of Health Gordons Warehouse; the National Spectacle Supply System and Area Medical Stores.

Establish a transparent procurement process for all AT: AT procurement in PNG may be further strengthened by the establishment of a procurement process that is clear to everyone.

This includes bringing together the many stakeholders who have skills in and are involved in procurement of a wide variety of AT such as NOPS, the Prevention of Blindness Committee, Callan Services as well as DPO representatives.

Table 4.2 provides an overview of factors that can help to improve procurement decision making.



Table 4.2: Procurement recommendations

| Towards transparent, effective procurement | |
|---|---|
| Ensure procurement decisions are made by: | |
| • Those who use or will use the AT | ✓ |
| • People with technical experience in the AT being procured (seek external assistance initially if this expertise is not available in PNG) | ✓ |
| • Service providers with experience in delivering the AT (or similar AT) | ✓ |
| Request and use evidence from suppliers about: | |
| • The supplier's accreditation for quality management standards such as ISO 9000/9001. | ✓ |
| • The results of relevant standards tests and/or trials | ✓ |
| • AT strength, durability, safety and functional performance within the PNG context (where available) | ✓ |
| • Availability of accessories and spare parts for maintenance and repair | ✓ |
| • Product warranty and returns policy | ✓ |
| Request a sample from the supplier in order to trial AT not previously used in PNG, in a range of contexts (rural and urban), with the assistance of users of AT and service providers, before high volume procurement | ✓ |
| Include in cost calculations and comparisons: | |
| • International freight and customs clearance | ✓ |
| • Internal freight to service sites | ✓ |
| • Service delivery costs including repair and maintenance | ✓ |
| • Reference to quality and/or potential longevity of the AT | ✓ |
| Document procurement decisions | ✓ |
| Identify methods to safeguard against conflict of interest and corruption | ✓ |
| Publish and make available to all stakeholders clear information about procurement processes | ✓ |

Identify efficient procurement strategies:

PNG stakeholders requested that the Government also explore procurement of AT in high volume, particularly where high volume is likely to reduce the unit cost and savings can be made on international freight. This may require combining Provincial Government orders and/or procuring on behalf of Non-Government service providers on a cost-sharing basis.

Understand the quality, cost and durability balance:

There are many different models of any type of AT. Some are more expensive, some more effective, some last longer than others and some are easier to use. Very low cost generally means the device is likely to be poorer quality and less durable.

However, it is possible to purchase good quality AT, appropriate for use in PNG at an affordable cost. The challenge of AT procurement is to find an acceptable balance of meeting users' needs; quality; durability (which reduces the frequency of replacement) within the constraints of the available budget. Figure 4.1 illustrates this balance

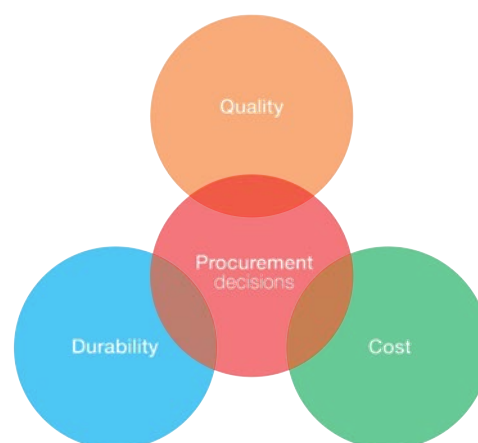


Figure 4.1: Quality, durability and cost balance

4.6.4 Develop PNG specific minimum standards

The National Institute of Standards for Industrial Technology (NISIT) has the capacity to support development of PNG Specific AT standards, with national stakeholders and external assistance. PNG specific minimum standards for the most commonly used AT would assist in providing a stronger basis for the selection of the most appropriate AT that best suits the PNG environment and the lifestyle of its people.

Working well with donors on procurement: NOPS experiences in wheelchair procurement

The National Orthotics and Prosthetics Centre (NOPS) has developed a strong relationship with The Church of the Jesus Christ of the Latter-day Saints (LDS) over a number of years.

Through their international humanitarian welfare programme, the LDS has an interest in providing wheelchairs for PNG citizens, and are committed to making sure that wheelchairs they donate are provided through a service delivery system. NOPS and the LDS have worked together (with input from a development partner) to select appropriate wheelchairs for PNG, which the LDS procure and ship to NOPS. This has included making sure that in each donation there is a range of different product types and sizes, and sufficient spare parts. All of the wheelchairs donated have been previously trialed in PNG and proven to be suitable.

To continue to strengthen the relationship, NOPS has provided the donor with statistical information about the wheelchairs provided. In addition, joint home visits (with permission from wheelchair clients) have been carried out so that the LDS can see that the wheelchairs have been provided to those who need them through a service system.

Acting Technical Advisor for NOPS says that the relationship with LDS *"is a positive one, because NOPS cannot work alone and partners are a strength for NOPS to deliver services. Donor partners getting views from service providers on the ground is the way forward for delivery of appropriate AT services for persons with disabilities"*.



4.7 Monitor, evaluate and assess the impact of AT service delivery

Guiding principles

Government and non-government service providers work together to:

- Develop systems to monitor, evaluate and assess the impact of the provision of AT that is internationally comparable.
- Actively involve users of AT in the process of monitoring, evaluation and assessment of impact.

4.7.1 Be clear about the purpose of monitoring, evaluation and assessment of impact

Good monitoring and evaluation of AT provision should help to assess the appropriateness of products provided, effectiveness of service delivery, whether AT provision is equitable, the cost of provision (and comparative cost of no provision), knowledge and skills of personnel relative to the AT available.

Monitoring and evaluation of AT provision should also identify whether services are being delivered in a rights based way and whether and how AT provision has improved (or not) the lives of persons with a disability and their family/carers.

4.7.2 Establish standard statistical data to be collected for all AT

Stakeholders may work together to agree a minimum set of data that should be collected when providing AT for each user, ensuring disaggregation of data by age, sex and impairment type. These Guidelines provide a suggested minimum data set (Annex 5) that could be used as a basis for this.

4.7.3 Integrate disability data sets, including the need for AT into existing data collection processes and tools

To understand the demand, plan for and assess the impact of AT provision it is necessary to include questions about persons with disabilities and their AT needs into national level data collection processes. This will ensure persons with disabilities as well as their met and unmet AT needs are counted.

Opportunities for improved disability data collection at the national level include adding questions into the National Census, Household Income and Expenditure Survey, National Demographic and Health Survey and the National Health Information Systems.

4.7.4 Support service providers to collect data and assess impact

To be able to routinely collect data when providing AT, service providers in PNG are likely to need support to establish the necessary data collection tools and train personnel. Service providers, DPOs, Governments and development partners are encouraged to work together to strengthen data collection capacities.

4.7.5 Establish a system to track AT and its use

An effective system of recording and monitoring AT and AT use is needed to help service providers record and track to whom, what and where AT is being provided, outcomes of follow up with users, and to help service providers collect and communicate data that can inform procurement decisions. A system such as the use of serial numbers for all AT could be explored.



4.7.6 Evaluate new AT and encourage research

When new AT is introduced into PNG, it is important for service providers and users to trial it and evaluate it to make sure it is suitable for users in the PNG context. Reports from trials and evaluations should be made readily available to all stakeholders.

Gather additional research to better understand the use of AT in PNG, including ways to ensure equitable access to appropriate AT services.

4.7.7 Establish a centralised location for data and information

Ideally, data collected by individual service providers could be centralised, to provide detailed information about users, AT and services to help inform policy and practice. The AT Resource Centre noted under section D above could potentially fulfil this role.

A centralised data system can also help ensure that as service sites expand all service providers are learning from, drawing on and contributing to existing information in a systematic and coordinated way. It can also help to identify priority AT and where it is needed.

4.7.8 Budget for monitoring, evaluation and impact assessment activities

Wherever possible, the cost of monitoring, evaluation and impact assessment activities should be included in Government and/or Development Partner budgets including the costs of travel, accommodation, reasonable accommodations and security.

Service providers committed to monitoring, evaluation and impact assessment: An example from the Network of Callan Services for Persons with Disabilities

The Network of Callan Services for Persons with Disabilities is working to strengthen the way they monitor and evaluate their work. They wish to continue and expand assessment of the quantity, quality, progress and impact of their service on the lives of persons with disabilities and their families. Callan has referenced these Guidelines in their most recent Strategic Plan and Operational Plans. To increase monitoring, evaluation and learning about AT service delivery, Callan Services plans to:

- Provide awareness raising and training on these Guidelines so that SERCs can improve and report on their AT service delivery.
- Include reporting on provision of AT in their standard reporting template for all SERCs;
- Encourage reporting on AT service delivery through the development and updating of CBR Case Management Plans and Individual Education Plans.
- Include the need to use these Guidelines in staff position descriptions; and review the use of the Guidelines in staff performance reviews.
- Include talking about AT service delivery with individuals and families when getting their perspectives on their service experience.
- Use information gained about AT service delivery through the above methods to learn about how AT is provided through Callan Services, how AT service delivery matches the Guidelines, what more could be done and what additional training may be needed by staff.

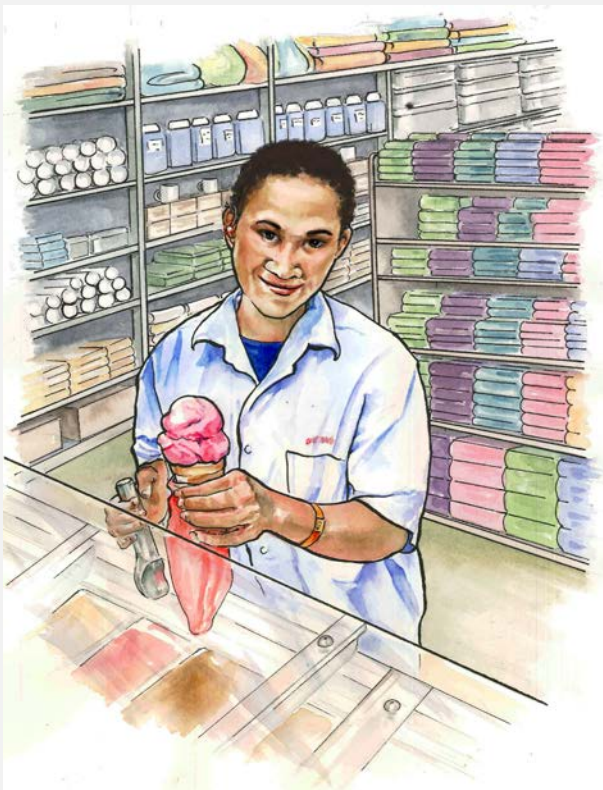


Chapter five: Effective Assistive Technology provision for persons with hearing impairment

This chapter includes:

- An overview of why hearing AT is important and an estimate of the number of people who have a hearing impairment in PNG.
- Information about what is needed to provide AT for people with a hearing impairment.
- Strategies to increase access to hearing aids in PNG and recommendations for training personnel.
- A recommended minimum range of hearing aids for PNG.
- A description of different types of hearing AT (hearing aids and other AT).

The right to AT facilitates the right to work: Stefhene's story



Stefhene is 22 years old and works at an Ice Cream Shop in Goroka. Stefhene says *"Work is gupla because I like to talk with customers and serve customers."*

Stefhene is from the Eastern Highlands. She has one sister and two brothers and likes to watch television, play games on her phone and spend time with her nephew.

When Stefhene was younger she went to school in Goroka. She enjoyed going to school because she had many friends. In Grade 5, Mt Sion Centre for the Blind assessed her and fitted her with a hearing aid. *"Mt Sion tried hearing aids on me and gave me the one that fit me best. Now, when the batteries run out I go back to Mt Sion to get new ones."*

Before getting a hearing aid Stefhene communicated with sign language or people came close to her and spoke to her very loudly. *"I hear well and clearly with my hearing aid. I like to wear my hearing aids so people don't yell at me to communicate."*



Terminology

| | |
|---|---|
| Hearing | Hearing is the ability to perceive sound. A person with normal hearing can hear sounds of 25 decibels (dB) or better in both ears. |
| Hearing impairment (hearing impairment) | <p>A person who is not able to hear as well as someone with normal hearing is said to have a hearing impairment. This can also be described as having hearing impairment. Hearing impairments may be in one or both ears; and may be:</p> <ul style="list-style-type: none">• Mild• Moderate• Severe• Profound <p>Hearing impairment may be 'congenital' (present at birth or very soon after) or 'acquired' (occurring at some time during a person's life). The World Health Organisation defines a 'disabling hearing impairment' as:</p> <ul style="list-style-type: none">• A hearing impairment greater than 40dB in the better hearing ear in adults [1]• A hearing impairment greater than 30dB in the better hearing ear in children [1] <p>The higher the dB loss the more severe the hearing impairment.</p> |
| Hard of hearing | Hard of hearing is a term sometimes used to describe people with hearing impairment that is mild – severe. Children and adults who are hard of hearing can usually communicate with spoken language, and are likely to benefit from a hearing aid. |
| Deaf | Deaf is a term used to describe people with a profound hearing impairment. Deaf people have little or no hearing, and are unlikely to benefit from a hearing aid. Sign language is a very important means of communication for people who are deaf. |



5.1 The importance of hearing AT

Hearing is very important for communication with others. Hearing also provides information about what is happening nearby and at a distance. The sounds around us (for example of weather, traffic, people) give us constant signals and information.

When a person has a hearing impairment, their ability to communicate with others is the major impact. However, a hearing impairment also makes it more difficult for a person to know what is happening around them. This can make it harder to move about safely, and to participate equally in social activities.

The impact of loss of hearing varies depending on how severe it is, and when the loss occurs.

Children who are born with, or acquire a hearing impairment early in life, may find it difficult to learn to speak. They may become isolated, as they find it difficult to participate in family, community and school life. This puts these children at a great disadvantage, and can greatly affect their opportunities in later life.

Early identification of children with hearing impairment, followed by provision of treatment (if appropriate), a hearing aid and/or opportunities to communicate in other ways can help enable these children to participate on an equal basis with their peers [2].

While acquiring a hearing impairment later in life is less likely to affect speech, there are still

big impacts. Hearing impairment will still affect the ability to communicate, and can lead to difficulties at work or when studying, as well as loneliness, isolation, frustration and loss of independence. Provision of hearing aids for people who are hard of hearing can ensure that this does not happen. For those who are deaf, learning and being supported in alternative ways to communicate (for example sign language and lip reading) is very important.

5.2 How many people in PNG have hearing impairment?

The World Health Organisation (WHO) state that hearing impairment is the most prevalent sensory disability globally. 360 million people worldwide have disabling hearing impairment (see terminology), which is approximately 5.3% of the global population [3].

There is no accurate measure of the prevalence of hearing impairment in PNG currently available. However, service providers consulted in the drafting of these Guidelines highlighted that hearing impairment is a significant problem for people of all ages in PNG.

Table 5.1 below shows an estimate of the number of people with hearing impairment in PNG using WHO global statistics for hearing impairment [1]. These statistics suggest that approximately 65% of those who have a hearing impairment are over 65 years of age. The problem is still significant amongst children however, and the impact of hearing impairment from a young age on a child's future opportunities needs to be considered.

Table 5.1: Estimate of the number of people with hearing impairment in PNG

| | % of global population (WHO Statistics) | In Papua New Guinea (2015 Population 7.6M) |
|---|--|---|
| Number of people who have a hearing impairment | 5.3% | 402,800 |



5.3 Hearing aid and other hearing AT services

5.3.1 *Hearing AT services as part of hearing health care*

Hearing AT services are part of an overall hearing health care system which includes:

- **Identification** of girls, boys, women and men who have a hearing problem.
- **Screening** of girls, boys, women and men with a hearing problem followed by:
 - Provision of basic ear health care.
 - Referral for medical and/or surgical treatment and further hearing assessment.
 - Referral for further hearing assessment and possible provision of hearing aids and other hearing AT.
- **Medical and/or surgical care** to treat or manage ear health conditions.
- **AT service delivery** to provide hearing aids and/or other hearing AT for those who will benefit.

5.3.2 *Identification and screening*

Identifying girls, boys, women and men who have a hearing problem requires the general community to be aware of the importance of recognising ear health problems and hearing impairment. The community also needs to know where to go, or who to talk to when problems are identified.

Once identified, an individual should then be screened by a trained person (for example an ear health care worker). Screening uses a standard screening tool and some basic equipment. The aim is to begin identifying what the cause of the child or adult's hearing impairment is.

Screening personnel are ideally trained to carry out basic ear health actions that may resolve the hearing problem and when to refer a child or adult for further detailed assessment.

5.3.3 *Medical ear health care*

Hearing impairment can be caused by many different things. Some common causes are [4]:

- Repeated ear infections
- Glue ear (a build up of mucus in the middle ear behind the ear drum)
- Meningitis, measles and mumps
- A build up of ear wax
- Maternal infections and birth complications
- Head or ear injuries
- Use of certain medications
- Exposure to very loud noise
- Aging

Some of these causes can be treated and the hearing impairment either reduced or cured. **For this reason, hearing AT services need to be closely linked to medical and/or surgical health care.** Hearing AT should be used only where the causes of hearing impairment have been investigated and any possible treatment provided.

Personnel involved in screening and in AT service delivery need to be sufficiently trained to be able to identify when referral to a doctor, audiologist or ear nose and throat specialist is needed.

5.3.4 *Hearing aid service delivery*

The most commonly used hearing AT are hearing aids. Section 5.7 of this chapter provides an overview of some of the different types of hearing aids. Of these, the most commonly used hearing aids in PNG are Behind the Ear (BTE) and Body Worn (BW). BTE and BW hearing aids are made of similar components. This includes a case that contains the electronics, controls, battery, microphone and loudspeaker; a tube, and an ear mould. The ear mould technology used affects the method of service delivery.



As for other AT, hearing aids are provided through a service delivery system as follows:

1. Identification, screening, and referral:

Girls, boys, women and men with a hearing problem are identified and referred for an ear health care screening by trained personnel. If a hearing aid is needed, the child, youth or adult is then referred to the closest hearing aid service. (Note: any medical issues may also be noted and either basic ear health care provided and/or a referral for further ear health care made).

2. Assessment of the user's needs: A more in-depth hearing assessment is carried out between the child or adult and trained hearing aid service provider. Assessment includes gathering information about the user's level of hearing, ear health, where they live, how far they are from the hearing aid service, where they go to school or work, their lifestyle, previous experience with a hearing aid and the type of hearing aid they prefer.

3. Prescription (selection): Using the assessment information, in discussion with the user (and their family members/caregivers), a hearing aid is selected.

4. Funding and ordering: The service provider identifies how the AT will be paid for. AT may be ordered from stocks held by the service provider, government stores, supplier or a donor.

5. Preparation of the AT: For both BTE and BW hearing aids, a custom mould that fits the user's ear needs to be made. There are two main methods to do this, both with advantages and disadvantages. The methods are:

Standard ear mould: An impression of the user's ear is taken and sent to a laboratory (workshop) where an ear mould is made by a trained technician. The finished mould is then returned to the service provider.

Instant ear mould: An instant ear mould is made using a silicone impression of the user's ear, which is

then the permanent ear mould. With this method, the hearing aid can be provided within one appointment.

Once the ear mould is complete, the hearing aid is assembled for the user.

6. Fitting: The user tries their new hearing aid, and volume levels are adjusted. Further adjustments such as reducing the amount of sound coming in and reducing background noise are then made. The amount of adjustment possible depends on the hearing aid.

The user gives feedback about how the hearing aid feels and how well they can hear, and any final adjustments are made.

7. User training: The user and (and their family members/caregivers) are taught how to use their hearing aid. This includes how to insert the ear mould, adjust the controls, when to turn the hearing aid off and using the hearing aid in different environments. The user is also taught how to look after the hearing aid including how to change the batteries, where to get replacement batteries or how to recharge batteries (if rechargeable), what to do if the hearing aid stops working. **An experienced hearing aid user is an ideal person to provide this training.**

8. Follow-up, maintenance and repairs: Adjusting to using a hearing aid can take time. Follow up support for new users is important. Follow up will also identify if the hearing aid is still working, and is an opportunity to make sure the user understands how to use their hearing aid. When problems occur, repair by a trained hearing aid technician may be needed.

If at follow up, the hearing aid is no longer meeting the user's needs, a new hearing aid may need to be supplied, starting again from step 1.



5.3.5 Other hearing AT

Hearing aids are the most common AT devices for people with hearing impairment. However, there are other AT available that can assist people with hearing impairment. Some examples of other hearing AT include:

- Direct Auditory Input (DAI) systems, which improve the ability of people wearing hearing aids to understand voices or other specific sounds (for example FM systems)
- Telephone typewriters
- Flashing or vibrating alarms
- Smart phone apps to assist with communication and activities of daily living (ADLs)

These AT are described in more detail in section 5.7.

Sign Language: An important tool for people with profound hearing impairment

Sign language, the fourth official language of PNG, is not discussed in any detail in these Guidelines as it is not Assistive Technology.

However, the importance of sign language as a tool for girls, boys, women and men with profound hearing impairment is acknowledged. The Government of PNG has committed to supporting the development of PNG sign language as a priority action under the National Policy on Disability 2015-2025.

Early exposure to sign language for children who are deaf is an important step in helping to make sure these children have the opportunity to develop communication and social skills, and access education. Sign language interpreters are very important in facilitating equal participation for persons with hearing impairment.

5.3.6 Personnel involved in hearing AT service delivery

Personnel involved in hearing AT service delivery include:

Community: A broad network of people at community level can help to identify people with ear and hearing problems and refer them to the

appropriate services. This includes families, community leaders, staff and volunteers from schools, churches, health clinics and more.

Ear health care workers: Provide screening and ear care services for infants, children and adults. Ear health care workers can provide basic ear health care, as well as identify when a person should be referred to an appropriate medical or audiologist service and/or hearing AT service. The role of an ear health care worker may be performed by a range of community level personnel with training.

Hearing aid service personnel: There are both clinical and technical roles in the provision of hearing aids.

The **clinical role** includes:

- Carrying out an assessment to identify whether a hearing aid is needed, and if so, which type of hearing aid is most suited to the user's needs (from those available).
- Making an impression for standard ear moulds and co-ordinate their fabrication, or using instant mould technology to make ear moulds.
- Assembling and fitting the hearing aid and providing user training. The clinician can also refer the user for further training by an experienced hearing aid user.
- Referring people with complex hearing problems to an audiology or medical service.

The **technical role** includes:

- Fabricating (making) standard ear moulds from ear impressions
- Maintaining and repairing hearing aids

Audiologists: Provide expert, non-medical management of disorders of the ear. They are university-trained clinicians with extensive knowledge of the ear and hearing. They may be required for provision of hearing aids, counselling and training on compensation techniques for people with hearing impairment.



Ear Nose and Throat (ENT) specialists:

Specialise in medical and surgical treatment of problems related to the ear, nose and throat. They play an important role in treating conditions that can cause hearing impairment.

5.3.7 Facilities, tools and equipment needed to provide hearing aids

To provide hearing aids, personnel need facilities, tools and equipment. Table 5.2 below provides an overview of what may be required to carry out the different steps of service delivery including screening, assessment, product preparation and user training.

In addition to the facilities described below, a dry, secure storage space is needed for all AT service delivery to store AT stock and materials,

tools and equipment, as well as AT that has been prepared for a user and is waiting for fitting.

Maintenance of tools and equipment is important to ensure that instruments are in good working order, readings (for example from an audiometer) are accurate and that services can be sustained.

5.3.8 Facilities, tools and equipment needed to provide other hearing AT

Non-hearing aid AT can be provided in a range of environments. Devices are usually best assessed for and provided in the environment in which they will be used, for example in the person's home, school or work place. The tools and equipment required will depend on the AT.

Table 5.2: Facilities, tools and equipment needed for hearing aid service delivery

| Facilities | Tools and equipment |
|--|---|
| <p>Hearing aid service delivery can be provided in a range of environments as long as the following is available:</p> <p>For screening, assessment and fitting: A clean and private space. The area should be as quiet as possible, away from visual distractions, traffic and other environmental noises.</p> <p>A noise-insulated environment such as a sound booth is ideal, however not essential.</p> <p>For product preparation and repair: This can occur in any clean, dry environment. Fabrication of standard ear moulds requires a dedicated laboratory (workshop).</p> <p>For user training: This can be carried out in a range of settings. Ideally initial training would occur in a quiet area, although learning to deal with a range of environments and noise levels is also helpful.</p> | <p>Screening: A small torch and noisemakers (made from household items) are useful for hearing screening.</p> <p>Assessment: A variety of tools are used including an otoscope, tympanometer, audiometer, and noisemakers (made from household items).</p> <p>Casting material with a syringe or gun applicator is used to produce an impression for a standard ear mould or the final product for an instant ear mould.</p> <p>Product preparation: A workbench or desk is needed along with some simple hand tools. Fabrication of standard ear moulds requires specialised equipment.</p> <p>Product repair: A hearing aid repair service requires specialised equipment including: a hearing aid analyser, microscope, soldering station, digital multimeter, and repair tools.</p> <p>Fitting: Depending on the type of hearing aid, adjusting and programming a hearing aid requires hand tools or a computer/tablet with software and cables.</p> |



AT and an inclusive work environment can change lives: Peter's story



Peter is 56 years old and a father of three girls. He is an experienced Panel Beater and Spray Painter. He is a Team Leader supervising a team of eight staff at his workplace, and acquired a hearing impairment after getting brake fluid in his left ear. He became very concerned about his ability to work because he found it hard to hear what his workmates were saying.

After two years of almost total silence he became aware of the hearing service available at Mt Sion Centre for the Blind. At Mt Sion, Peter's hearing was assessed and he was fitted with a hearing aid with an ear mould. His work paid for the hearing aid to assist Peter to be able to work. This is a good example of an employer providing 'reasonable accommodation' to ensure that a person with a disability can work.

Peter says that his hearing aid *"changes my life now"*. He can participate more in his family, communicate with others and do all the duties required of him at work. Peter always makes sure he looks after his hearing aid by cleaning it and keeping it in a safe place when he is not using it. Over the years his hearing aids have lasted about 2-3 years before he needs to be re-assessed and provided with another one.

For Peter, access to appropriate AT has not always been easy. He says *"The batteries are a big problem because they only last 3-4 months and mobile phones are a big problem because they do not work well with my hearing aid"*. This limits his ability to communicate and participate like everyone else. He hopes for a better solution in the future so that he can access the AT he needs to be more active in his everyday life.

5.4 Strategies to increase access to hearing aid services in PNG

5.4.1 ***Increase identification of girls, boys, women and men with hearing impairment and/or ear health problems***

PNG stakeholders recommend raising awareness at community level of the importance of ear health, recognising hearing impairment and/or ear health problems to increase referrals to ear health care workers for screening.

Awareness raising should include:

- How to maintain ear health
- Explaining why identifying hearing impairment and/or ear health problems is important
- Signs to look for that indicate hearing impairment and/or ear health problems
- Who to refer to when a problem is identified

Suggested ways to raise awareness include:

- Using public media such as the radio, newspapers and facebook to share success stories and provide awareness raising information.
- Making use of outreach visits to communities to give awareness raising information and materials (such as posters).
- Targeting community organisations and/or services such as churches, schools, health clinics and providing awareness raising information and materials (such as posters).

More awareness raising ideas can be found in Annex 1: Advocacy and awareness raising strategies.



5.4.2 Increase ear health and hearing impairment screening and referral

Suggested strategies include:

- Establish and implement a standardised screening protocol that can be used by trained personnel to screen and refer girls, boys, women and men with identified hearing impairment and/or ear health problems. The screening tool developed and used by The Network of Callan Services for Persons with Disabilities (Callan Services) is a sound basis for this.
- Train more personnel from a broader range of services in how to carry out screening and referral (using the standardised screening protocol). Organisations that could be involved in screening include schools, community health clinics, churches.
- Ensure all CBR workers are trained to carry out ear health and hearing impairment screening.
- Integrate training on carrying out ear health and hearing impairment screening into courses for teachers, early childhood workers, community health workers and nurses and other community level personnel.
- Hearing aid service providers and other disability service providers may carry out outreach screening programmes to communities where there are no trained screening personnel in place.

5.4.3 Increase the number of hearing aid services and the number of hearing aids they can provide

Hearing aid services are currently provided in PNG primarily through non-government service providers, with Callan Services being the main provider.

The capacity of these hearing aid services is limited by the number of trained personnel, funding to procure hearing aids, and the technology used to make ear moulds.

Increasing the number of hearing aid services and the number of hearing aids they can provide will require strong partnerships between

the PNG Government and Non-Government organisations, as well as commitment along with investment in training and exploration of alternative hearing aid technologies.

Some specific strategies may include:

- Formalising an in-country training course for hearing aid clinical and technical personnel. Recommendations for course content and duration of training can be found in Table 5.3.
- Explore opportunities for improved ear mould technology, as a means of increasing the number of hearing aids that can be provided by the same number of personnel within a shorter timeframe.
- Standardise and streamline the systems used for hearing aid service delivery including assessment, selection, fitting, product preparation and user training.
- Establish a centralised system and focal point for procurement of hearing aids and spare parts, in order to benefit from bulk procurement.
- Work with international partners to identify reputable suppliers of quality hearing aids and spare parts that meet the needs of PNG users and can be supplied within PNG service delivery models.
- In addition to these strategies, PNG stakeholders recommend that there also be a focus on increasing the number of ear health care specialists including audiologists and speech therapists. These personnel can be a support to basic level hearing AT service providers and their personnel; and available to provide specialist input for girls, boys, women and men with ear health and hearing needs that require their input.



5.5 Training of personnel involved in hearing AT service delivery

Successfully providing AT for people with hearing impairment relies on trained personnel. The amount of training needed varies, depending on the AT and the role of personnel.

In consultations for these Guidelines, stakeholders prioritised hearing aids as the most important AT for girls, boys, women and men with hearing impairment at this point in time in PNG.

Table 5.3 provides recommendations for the minimum training that would equip screening, clinical and technical hearing aid service personnel with the competencies needed to perform their role in hearing aid service delivery.

There are existing resources available in PNG, developed by Callan Services (Hearing Health Skills [5].) and externally (such as The World Health Organisation's *Primary Ear and Hearing Care Training Resource: Basic Level* [4].) that could be used as a starting point to develop

standardised, in-country training that specifically suits the needs of PNG personnel.

Stakeholders additionally recommended the use of trainers from overseas to assist in finalising training material and developing national trainers.

Managers of hearing aid services also need training. In addition to generic management skills, these personnel need a good understanding of the causes, prevention and effects of hearing impairment, as well as hearing aids and their uses. This understanding will assist managers to ensure there are systems in place to identify and refer any client who may benefit from medical ear care; support service personnel; build referral networks; ensure the service, facilities and tools are working towards quality service standards and make good procurement decisions.

Following training, support for trained personnel in their workplace is essential. This includes supporting personnel with the tools and facilities required to carry out their role; clinical and technical supervision and support; and continued professional development.



Table 5.3: Minimum training recommended for hearing aid service personnel

| Role | Course and/or recommended content | Duration | Assessment |
|-------------------------------------|--|---|--|
| Screening and referral | Ear health and hearing screening and referral training [6] including: Basic anatomy of the ear; common causes of hearing impairment and obvious symptoms; understanding the effects of hearing impairment on speech and communication; the needs of people with a hearing impairment; how to carry out an ear health and hearing screening; basic ear health care; basic information about using and maintaining hearing aids. | 2-3 days followed by supervised practise. | Attendance certificate |
| Hearing aid clinical role | Hearing Aid Clinician course including: Anatomy and physiology of the ear; common causes of hearing impairment and their symptoms; understanding the effects of hearing impairment on speech and communication; the needs of people with a hearing impairment; assessment of hearing using noisemakers, otoscope, tympanometer and audiometer; the use, calibration and maintenance of audiology equipment; hearing aid function and use; how to assemble, fit and adjust a hearing aid, basic adjustment, user training and trouble shooting; how to make an instant ear mould and/or standard ear mould impression. | Duration requires further course development in PNG, along with reference to international work under-way to develop this form of training. | Competency based assessment carried out by trainers. |
| Hearing aid technical role/s | Hearing aid technical course [6], which may be delivered in two parts: <ul style="list-style-type: none"> • Repair and maintenance of hearing aids: basic acoustics and acoustic measurements of hearing aids using hearing aid analyser; hearing aid trouble shooting and replacement of broken hearing aid parts; calibration of acoustic measuring equipment; quality control • Fabrication of ear moulds (where standard custom ear moulds are used): Basic understanding of hearing aids and their use; examination of the ear using an otoscope; taking an ear impression; ear mould manufacture, modification and repair. | Duration to depend on the ear mould technology adopted in PNG and therefore the required competencies of hearing aid technicians. | Competency based assessment carried out by trainers. |



5.6 A range of hearing aids provided through a service

The most common AT for people with hearing impairment are hearing aids. Stakeholders identified hearing aids as the priority AT device for people in PNG with hearing impairment.

Hearing aids are not a “one type fits all” device. The differences between people, their different types and levels of hearing impairment, and the different things they need to do, means that not everyone will be able to successfully use the same type of hearing aid. Each hearing aid will need to be adjusted and programmed to ensure that the fit and function meet the users needs.

For these reasons, availability of a range of hearing aids, and their provision through a service staffed by trained personnel is very important. Having a range of different devices to choose from, means that personnel can prescribe hearing aids that best meet the preferences, and functional, lifestyle and physical needs of users.

The WHO recommends prioritising hearing aids for “children with an average hearing impairment in the range of 31 to 80 dB (decibels) in the better ear in the frequency range 500Hz to 4 kHz, followed by adults with an average hearing impairment in the range 41 to 80dB in the better ear, in the same frequency range” [6].

It is important that at a minimum, available hearing aids meet the needs of the majority of people that fit within this range.

In PNG, the main components of hearing aids will need to be imported. However, fabrication of ear moulds, assembly of devices and repair and maintenance can occur locally.

Digital Hearing Aids

The most familiar hearing aid technology in PNG to date is analogue. However digital hearing aids are fast becoming the preferred choice of hearing aid in many parts of the world. In contrast, analogue technology is used much less, and will soon become obsolete (no longer produced).

Digital hearing aids have advantages over analogue hearing aids for users, are cost effective due to their durability, and can be programmed in different ways (not always requiring a computer).

For more information about analogue and digital hearing aids, see section 5.7.

To realise the rights and meet the different needs of women, men, girls and boys with hearing impairment in PNG, these Guidelines recommend a minimum range of hearing aids and components for provision in PNG, which may be built on over time. This list is outlined in Table 5.4.

More detailed descriptions of these items can be found in section 5.7, and information about procurement of these items can be found in Annex 6. As for other AT, well informed technical advice should also be sought when making procurement decisions.



Table 5.4: Categories of hearing aids recommended for use in PNG

| Type of hearing aid / AT | Components |
|--|---|
| Body worn (BW) Digital Behind the Ear (BTE) | <p>For each type of hearing aid (BW and BTE):</p> <ul style="list-style-type: none"> • Ear moulds: At least one option for custom ear moulds and one option for standard flexible dome style ear moulds (for temporary use). • Batteries: Disposable and rechargeable battery options compatible with selected hearing aids in sufficient quantity for the number of hearing aids. • Battery charger: Mains and solar powered options for rechargeable batteries. |
| Direct Auditory Input (DAI) System | At least one FM system option |



5.7 Description of hearing AT

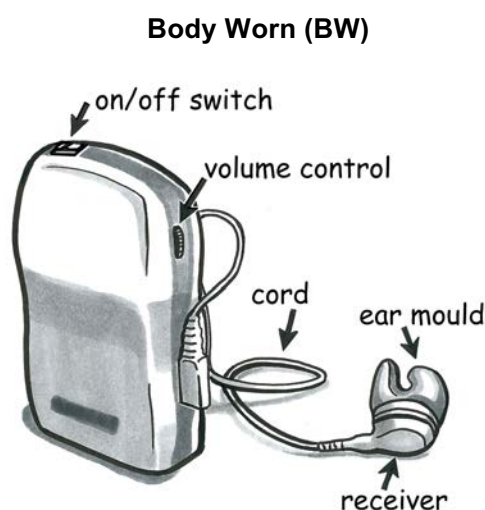
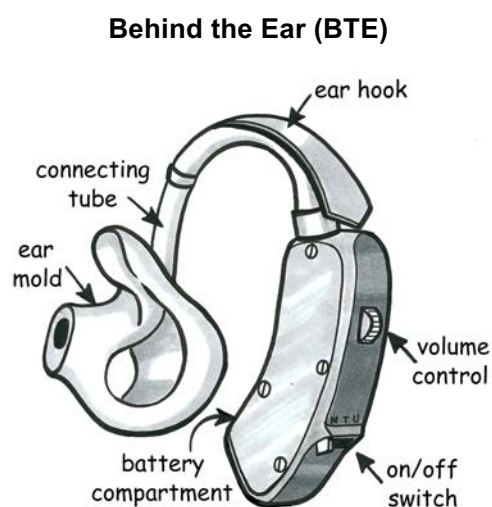
The following is a description of different hearing AT including hearing aids. Not all of the AT described below is on the recommended range of hearing AT in section 5.6 above. Other types of hearing aids, and other hearing AT is included here as a reference for PNG stakeholders.

5.7.1 Hearing aids

Overview

Hearing aids are devices that make some sounds louder so that a person with hearing impairment can hear more easily. Common types of hearing aids include:

- **Behind the Ear (BTE):** Which has a plastic case that sits behind the ear and is connected by a tube to an ear mould.
- **Body Worn (BW):** Which has a plastic case that fits into a pocket or attaches to clothes and is connected by a tube to an ear mould.
- **In the Ear (ITE):** Which fits completely inside the ear (in the ear canal).
- **Spectacle hearing aid:** Which has a hearing aid built into spectacle frames that is connected by a tube to an ear mould.
- **Cochlear implant:** An electronic, surgically implanted device that allows users to experience sounds as they occur by sending electrical signals to the nerve endings in the inner ear



Direct Auditory Input Systems are often used in conjunction with hearing aids, to assist the hearing aid user to hear specific voices and noises in environments where there may be a lot of background noise.

BTE and BW hearing aids can be used for people with mild to profound levels of hearing impairment [7]. The choice of which type to use depends on each person's preference, their main activities and their access to appropriate batteries and support. For all hearing aids there are features that affect how easy the hearing aid is to use, and what the hearing aid can do for the user. The most important features are listed below, and described further on the following pages.

- **Ear moulds:** Fit inside the ear (ear canal) and direct the sound to where it needs to go.
- **Batteries:** Provide power to the hearing aid.
- **Digital or analogue:** Two different methods for processing the signals within the hearing aid.
- **Compression:** Decreases the range of sound signals in the environment.
- **Feedback management:** Helps to reduce 'feedback' which can cause the user to hear 'whistling'.
- **Tele-coil facility:** An alternate input device for the hearing aid, enabling the use of Direct Auditory Input Systems.
- **Volume control:** For user comfort.
- **On/off switch:** To increase battery life.

Summary of the different types of hearing aids

Hearing aids make sounds louder so that a person with hearing impairment can hear more easily. Some examples of hearing aids are described below.

Behind the ear (BTE): Consists of a case that sits behind the ear. The case is connected to an ear mould that sits within the ear. The case contains the electronics, controls, battery, microphone and loudspeaker. Tubes with the ear mould at the end direct the sound from the hearing aid into the ear. The hearing aid is most effective with a custom made ear mould (made specifically for the user). However, there are generic fit options available (see below).

BTE hearing aids can be used for people with mild to profound hearing impairment [7]. They are suitable for active people.

The batteries for this device need to be replaced frequently, however can be expensive and hard to get in remote areas. Rechargeable options are preferable if available.



In the Ear / Canal (ITE/ITC): All of the parts of this device are enclosed in a case that is moulded to fit inside a person's ear or ear canal. These devices are more expensive, more difficult to fit and more prone to breakdown as a result of ear discharge [8] than other models. They are not recommended for use in PNG.



Body worn (BW): Consists of a case that is connected by a wired cord to ear moulds that sit inside one or both ears (ear canals). The case is about the size of a pack of cards. It contains the electronics, controls, battery, and microphone. The loudspeaker is either contained in the case or the ear mould. The hearing aid is most effective with a custom made ear mould (made specifically for the user). However, there are generic fit options available (see below).



BW hearing aids can be used for people with mild to profound hearing impairment. The devices use readily available AA or AAA batteries, and some designs also have a built in solar charger. This style of device is generally easier to use and maintain than other hearing aids. In PNG stakeholders report that it is often preferred by older people as they find the controls easier to use.

Spectacle hearing aids: With this type of hearing aid the case that contains the electronics, controls, battery, microphone and loudspeaker is build into the frames of the user's spectacles. As for BTE and BW hearing aids, this is attached via a tube to an ear mould that sits inside the ear (ear canal). Spectacle hearing aids are useful for people with vision **and** hearing impairment, where using spectacles affects the fit and comfort of a BTE or BW hearing aid.

Some factors to consider with these devices:

- Spectacle frames are larger and heavier than just wearing a hearing aid
- Users wear both devices together as they cannot be separated
- The spectacles need to be removed to change the hearing aid batteries, so the user may need help to change the battery if they are unable to see without spectacles

Cochlear implant: A cochlear implant is a reliable and effective treatment for severe-to-profound hearing impairment in girls, boys, women and men. This electronic, surgically implanted device allows users to experience sounds as they occur by sending electrical signals to the nerve endings in the inner ear [9].

The WHO does not recommend the use of Cochlear implants unless appropriate, medical, educational, psychological and hearing therapist resources and services are available [6]. The WHO further suggests that the "resources required for cochlear implantation could be more effectively used to prevent a greater burden of hearing impairment in more people through use of less costly intervention" [6].

Therefore given the lack of support services available and the high costs of Cochlear implantation, this intervention and the related device are not recommended for use in PNG in the immediate future.

Hearing aid features

Hearing aids can be set up in many different ways to best meet the needs of the user. There are some important features that are desirable in all hearing aids which are described below.

It is important to note that hearing aid technology is advancing very fast. More, lower cost options are being made available. Initiatives such as the WHO Global Cooperation on Assistive Technology (GATE) are helping to drive affordable solutions for all types of AT, including hearing aids. PNG stakeholders should be prepared to continue to research and explore different hearing aid technologies.

Ear moulds: Ear moulds are used with BTE, BW and spectacle hearing aids. They fit inside the user's ear canal to direct sound where it needs to go. A well fitting ear mould is very important for a hearing aid to work well and be comfortable. Children need a new ear mould several times a year as their ears grow. Unless there is a problem, adults need new ear moulds approximately every two years. There are three ear mould options:

- **Custom ear moulds from impression:** A trained worker takes an impression mould of the user's ear. This impression is sent to a laboratory where a custom ear mould is made. The custom ear mould is then sent back to the trained worker who assembles the hearing aid for the user. This method provides good results for fit and function, however it can take some weeks to receive the device and requires laboratory space, trained technicians, and reliable transport services.
- **Instant silicone-injected ear moulded:** With this method a trained worker makes a silicone impression mould of a user's ear. This silicone impression mould is then used as the permanent hearing aid ear mould. This method allows same day fitting of a hearing aid in potentially more locations, as long as there are trained personnel available.
- **Standard flexible dome ear moulds:** These items allow the use of a hearing aid without a custom ear mould. They are available in different sizes to match the users needs. This type of mould has a number of disadvantages including discomfort for the wearer and feedback ('whistling'), which frequently results in abandonment of the device. This type of ear mould should only be used where there is no option for a custom mould.

Batteries: All hearing aids require the use of batteries. Depending on the style of battery these can be expensive. It is very important that the correct battery is used for the specific device. There are three main types of batteries used in hearing aids.

- **'Hearing aid' batteries:** Sometimes called button batteries these are used in most BTE, ITE/ITC and spectacle hearing aids. They come in different sizes for use in different hearing aids and are most commonly zinc-air types. At least twenty zinc-air batteries are required for each hearing aid per year. This type of battery is often not available locally so service providers need to provide users with spares and stock replacements. Mercury batteries should not be used, as mercury is toxic to people and the environment.
- **Standard AA or AAA batteries:** These batteries are used in BW and FM systems. These batteries last longer than button batteries and are available in most locations.
- **Rechargeable batteries:** Both the button style and AA or AAA batteries have rechargeable options. Rechargeable batteries are more cost effective than disposable ones. A rechargeable battery should last for one to two years. The regularity and length of charging required will differ for different styles of batteries and rechargers.
- **Battery recharger:** Battery rechargers are needed with rechargeable batteries. There are different methods of recharging as follows. Some rechargers use some or all of these methods.
- **Solar powered:** Recharged by the sun (with at least one hour in the sun per day).
- **Mains powered:** Recharged by household or mains electricity
- **Battery powered:** Uses a larger battery such as a car battery to recharge.



Digital or Analogue: Digital and analogue refers to the way that sound is processed within the hearing aid. Both recommended styles of hearing aids, BW and BTE are available as digital or analogue. The WHO Preferred Product Profile for hearing aids specifies digital hearing aids over analogue, however both types are described here as analogue is commonly used in PNG [8].

- **Analogue:** An analogue hearing aid takes all the sound picked up by the hearing aid microphone and makes it louder. The setting can be changed slightly for different users' needs, however there is not a lot of adjustability possible [10]. Analogue hearing aids are now used very little in developed countries. However, in developing countries they may continue to be used. This generally because they are perceived to be lower cost than digital hearing aids and easier to set up as this is done manually with hand tools (not requiring a computer / tablet)
- **Digital:** Digital systems allow greater flexibility (than analogue) to shape what the user hears, in order to accommodate the needs of users with different types of hearing impairment. They are able to make some sounds such as voices louder, while making other background noises quieter. In many cases a computer with appropriate software is needed to fine tune the hearing aid to suit each user. However there are digital hearing aids available that can be programmed without the use of a computer [11], and some may be pre-programmed. Some advantages of digital hearing aids are:
 - Greater range of programmable adjustment to meet the needs of different users.
 - Able to reduce feedback (reducing the tendency for the hearing aid to 'whistle').
 - Can be adjusted by the user.
 - More durable than analogue hearing aids.

The cost of digital hearing aids has been an issue in many developing countries, however the cost is now becoming less. Exploration of appropriate, quality digital hearing aids for PNG is recommended.

Compression: Is an essential feature of any hearing aid. Compression decreases the range of sound levels in the environment to match the reduced hearing range of the user. This can make loud sounds more comfortable and speech easier to understand [8]

Feedback management: Feedback or 'whistling' can be a problem for hearing aid users. It is most often caused when ear moulds do not fit properly. A feedback management system that stops this feedback is important, especially if custom ear moulds are not being used. [8]

Tele-coil facility: A tele-coil embedded in the hearing aid picks up electromagnetic signals directly from devices bypassing the normal microphone. The electromagnetic signal can originate from a wearable device or from a loop of wires built into a classroom, church or meeting hall.

The user can switch their hearing aid to tele-coil mode, which turns off the microphone and allows the user to receive audio input from the tele-coil. The tele-coil can be partnered with a FM System or other Direct Audio Input system to allow users to hear voices transmitted directly into their hearing aids



Volume control: Easily accessible volume controls are important for users to allow them to adjust levels in different environments. The ability to easily adjust the volume is important for user comfort [8].

On/Off switch: Being able to turn the hearing aid off is important to save so that batteries can last longer. Not all hearing aids have an on/off switch, some require the battery slot or door to be opened to turn off the device. This can be difficult to do, exposes the battery to humid conditions and makes batteries more easily accessible to children.

Summary of Direct Auditory Input (DAI) Systems

DAI systems work together with a user's hearing aid to help them hear the most important voices and sounds in environments where there may be a lot of background noise. DAI systems are particularly in classrooms, meetings, churches etc. DAI systems include FM systems and induction systems.

FM systems: These consist of a microphone placed close to the person speaking, which sends a signal via radio waves directly to the user's hearing aid. The signal can be transmitted to the user via:

- A tele-coil built into their hearing aid
- A direct audio input receiver attached to the hearing aid
- Headphones or earphones for people who do not use hearing aids

Induction systems: Also called induction or hearing loops, these transmit electromagnetic signals to a tele-coil within hearing aids. Induction loops come in different forms including:

- **Room systems:** This involves conductive wire being laid around all or part of a room. When the tele-coil function of a hearing aid is turned on, hearing aid users within the loop can hear the transmitted signal. This can be used to transmit signals from a microphone, a television, radio etc. This system is often used in schools, churches and auditoriums.
 - **Portable systems:** These are an all in one device which sit on a desk or table and use a microphone to pick up a voice and transmit it via an electromagnetic signal to the tele-coil system. These are designed for use on customer service desks, in shops or for small meetings.
 - **Individual systems:** These devices allow individuals to wear a small induction loop on their body to create an electromagnetic field. These can be used with a FM system or mobile phone for easier voice recognition, or used to listen to a television, radio or mp3 player without background noise.
-

5.7.2 Other hearing AT

Overview

There are numerous hearing AT available to assist a person with hearing impairment to better communicate with others, or alert them of a particular noise, event, or emergency. Some of these AT are outlined below.



Alarms: There are numerous alarm systems available to help people with hearing impairment go about their daily lives. They generally use flashing lights or vibrations to attract the attention of the user. These devices include: alarm clocks, door bells and fire or smoke alarms. There are also alarms with a microphone that picks up a baby's cry and transmits a signal to cause a vibration or flashing light in order to alert the baby's caregiver with a hearing impairment.

Smart phone apps: There are number of different applications that can be used on a smart phone to assist people with hearing impairment in everyday life. The quality of these apps vary, may require regular access to the internet and use a lot of phone battery power. Some examples are:

- **Amplifier apps:** Use the microphone of the phone to pick up sounds and making them easier to hear. They may have some features of a hearing aid such as; improve sound clarity, isolation of specific sound frequencies and reduction of background noises [12].
- **Hearing aid remote apps:** Can be paired with some hearing aids to remotely adjust settings. Not all hearing aids will be compatible with these systems.
- **Captioning apps:** Translate phone calls to text on the screen.
- **Dictation apps:** Instantly transcribes what a person says into written text that appears on the phone's screen.
- **Alert apps:** Allows users to react to sounds. When the microphone detects a loud sound the phone vibrates and flashes to alert the user.
- **Sign language apps:** There are various apps available that can assist in teaching sign language, however these are not currently available in PNG sign language.

Universal design on smart phones: There are also many features built into smart phones designed for people with hearing impairment such as vibrations and flashing screens.



5.8 References

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Chapter six: Effective Assistive Technology for persons with mobility impairment

This chapter includes:

- Why mobility AT is important and an estimate of how many people in PNG need mobility AT.
- Information about what is needed to provide AT for people with a mobility impairment.
- Strategies to increase access to mobility AT in PNG and recommendations for training personnel.
- A recommended minimum range of mobility AT for PNG.
- A description of different types of mobility AT.

Appropriate AT makes positive changes in people's lives: Samson's story



Samson lives in a rural village outside Port Moresby with a large family. He has a spinal cord injury caused by spinal tuberculosis (Pott's disease). When Sampson first got his spinal cord injury, and returned from hospital, he was unable to get out of bed and move about. He and his family built a platform underneath their home for his bed because he could not get up the stairs. Samson's muscles became weak from lying in one place, and he needed a lot of help for his daily care.

When Samson received a wheelchair along with training in how to use the wheelchair from NOPS, his situation

changed. He is now able to be mobile, because his body got stronger from moving around. He learned to get out of bed and into his wheelchair without help. He moves around his village on his own, visiting family and friends. Samson now earns money for his family by carving craft items to sell.



Terminology

The following words are used throughout this Chapter and in other places in the Guidelines. The meaning of each word as it is used in the Guidelines is described below. For more detailed information about different mobility devices, see section 6.7 of this Chapter.

| | |
|-----------------------|---|
| Personal mobility | The ability to move in the manner and at the time of one's own choice |
| Mobility AT | Assistive technology designed to help a person with a mobility impairment to be able to move around more. Mobility AT may also be called a mobility device. |
| Wheelchair | A device providing wheeled mobility and seating support for a person who has difficulty in walking or moving around [1] |
| Manual wheelchair | A wheelchair that is propelled by the user or pushed by another person [1] |
| Lower limb prosthesis | A device used to replace a missing part of a person's foot or leg |
| Lower limb orthosis | A brace, splint or other external device which supports a person's foot or leg to either prevent un-wanted movement; or assist movement |
| Walking aid | A device used to increase the personal mobility of a person who has difficulty walking. Walking aids include crutches, walking frames and walking sticks |



6.1 The importance of mobility AT

Personal mobility means the ability to move in the manner and at the time of a person's own choice.

This includes moving about at home, outside the home and in the wider community. Personal mobility also means being able to move from one surface to another, for example getting out of bed, getting up from a chair, and getting in and out of a vehicle.

Being able to move is important for all areas of life for girls, boys, women and men. Being mobile has a big impact on health, social and economic life, and enables access to education and employment.

The right to mobility is clearly stated in article 20 of the CRPD [1]. For many people with a mobility impairment, an appropriate mobility device is needed for them to be able to secure their right to personal mobility. Accessible environments that take into account the mobility needs of people are also important.

Mobility AT includes walking aids, wheelchairs with or without modifications, lower limb prosthetics and orthotic devices. Walking aids include crutches, walking sticks and walking frames. These AT are described in further detail in section 6.7.



6.2 How many people need mobility AT in PNG?

The World Health Organisation (WHO) estimates that in any population:

- 1% of people need a wheelchair
- 0.5% of people need a prosthetic or orthotic device.

There are no statistics available about how many people may need a walking aid. However, experience in PNG has shown that there is a significant unmet need for these devices.

Table 6.1 below provides an estimate of how many people in PNG may need mobility AT, using the available statistics. Increasing rates in PNG of diabetes (which can lead to amputation) and other non-communicable diseases, may mean the number of people who need mobility AT is higher than shown.

It is also important to remember that some people may need more than one mobility AT. For example, a person with a lower limb amputation may have a prosthetic limb and a walking aid; or a frail, older person may use a walking aid for short distances, and a wheelchair for longer distances.

Table 6.1: Estimate of the number of people who need mobility AT in PNG

| Number of people who need a: | % of any population (WHO Statistics) | In Papua New Guinea (2015 Population 7.6M) |
|-------------------------------|--|--|
| Walking aid | No available statistics, however experience in PNG suggests the demand is high | |
| Wheelchair | 1% | 76,000 |
| Prosthetic or orthotic device | .5% | 38,000 |

6.3 AT services for people with a mobility impairment

6.3.1 Overview of mobility AT services

Successfully providing mobility AT to girls, boys, women and men relies on staff trained to provide the AT as well as a range of appropriate mobility AT, facilities, tools and materials.

The amount of training, facilities, tools and materials needed varies, depending on the AT. Some mobility AT can be easily provided in the community. For other AT, staff need access to more tools, equipment and workshop facilities.

Walking aids can be provided to users in a range of different settings (community, health clinics, mobility AT services), by personnel with a small amount of training. A few simple hand tools may be needed to adjust the walking aids, which can be easily carried by personnel.

Wheelchairs can also be provided to users from a range of different settings. How easily this can be done will depend on the needs of the user. Wheelchairs for people who can sit upright without any extra support can be provided by personnel with less training, with some basic tools, equipment and materials. Wheelchairs for people who need extra postural support to sit well should be provided by personnel with more training. Additional tools and materials are usually needed, to make adjustments and modifications so the wheelchair suits the user as well as possible.

Prosthetic and orthotic AT needs to be provided by personnel who have had much more training. These personnel need tools, equipment and workshop facilities to make the devices. Prosthetic and orthotic AT is best provided from an established site, with clinic and workshop facilities. Provision in the community is possible, however a lot more preparation is needed to ensure all equipment needed is available.



6.3.2 Basic and intermediate level mobility AT services

Some categories of mobility devices are more complex to provide than others. This relates to:

- The needs of users, as some users need more postural support and/or mobility assistance than others.
- The amount of training personnel need to assess and meet the user's needs.
- The amount of individual fabrication needed to be sure the AT meets the user's needs.
- The tools and equipment needed to fabricate the mobility AT.

For these reasons, it is recommended that:

- Walking aids and wheelchairs without modifications are provided through **basic level services**.
- Wheelchairs with supportive seating and/or customised pressure relief and lower limb prosthetic and orthotic AT is provided through **intermediate level services**.

Table 6.2: Recommended service levels for mobility AT [2] [3]

| Type of mobility AT | Service Level | |
|---|---------------|--------------|
| | Basic | Intermediate |
| Walking Aids | ✓ | ✓ |
| Wheelchairs without or with only minor modifications | ✓ | ✓ |
| Wheelchairs with supportive seating and/or customised pressure relief | x | ✓ |
| Lower limb prosthetic devices and lower limb orthotic devices | x | ✓ |

6.3.3 Providing mobility AT through eight service delivery steps

As for other AT, mobility AT are provided through a service delivery system as follows:

- 1. Identification, screening and referral:** Girls, boys, women and men with a mobility problem may self-refer, or be identified and referred by anyone in the community. Broad awareness at community level of where to access the different categories of mobility AT is important.
- 2. Assessment of the user's needs:** A different assessment is carried out depending on what category of AT the user needs. Assessment always includes gathering information about the user's level of mobility, any physical condition/s they may have, where they live, how far they are from the mobility AT service, where they go to school or work, their lifestyle, previous experience with mobility AT and the type of mobility AT they prefer.
- 3. Prescription (selection):** Using the assessment information, in discussion with the user (and their family members/caregivers), the most appropriate mobility AT from those available is selected. For many users the process of selection is easier if they are able to see and if appropriate try the different types of AT available.

Some mobility AT users may use more than one type of mobility AT. For example a person with a prosthetic limb may need a walking stick for additional support when walking outdoors.
- 4. Funding and ordering:** The service provider identifies how the AT will be paid for. AT may be ordered from stocks held by the service provider, government stores, supplier or a donor.



5. Preparation of the AT:

- **Walking aids:** Only a small amount of preparation is required. This is primarily to adjust the height of the walking aid.
- **Basic wheelchairs:** Depending on the type of wheelchair, the wheelchair may first need to be assembled. The technician will then adjust some of the components (for example footplates) to meet the user's measurements. Sometimes a cushion needs to be made, or cut to size. Any minor modifications detailed in the prescription are also made.
- **Intermediate wheelchairs:** Again, depending on the type of wheelchair, the wheelchair may first need to be assembled. Adjustment and/or fabrication of postural supports, is then carried out.
- **Prosthetics:** A plaster cast is taken of the user's limb (stump), which is then used to make a socket. The prosthetic limb is assembled from a number of components (see section 6).
- **Orthotics:** Depending on the orthotic, a number of different fabrication methods are used to make orthotic AT. Some orthotic AT is available 'ready made' and is adjusted or modified slightly to suit the user.

6. **Fitting:** The user tries their mobility AT, and gives feedback about how it feels and how well they can move. Fitting can take some time, and adjustments are often required, particularly for intermediate wheelchairs, prosthetics and orthotics. For these AT, sometimes more than one fitting is necessary.

7. **User training:** The user and (and their family members/caregivers) learn how to move with their AT. This includes being mobile in the different environments in which they will use their AT. Those using a wheelchair also need to learn how to get in and out of their wheelchair safely.

User training includes how to look after the AT, home maintenance, and what to do when something goes wrong. **An experienced user of the same category of mobility AT is an ideal person to provide this training.**

8. Follow-up, maintenance and repairs:

Follow up is an opportunity to check that the AT still fits, is in good working order and is meeting the user's needs. The timing of follow up will depend on the category of AT and the needs of the user. Children need to be followed up more frequently as they grow and their needs change.

If at follow up, the mobility AT is no longer meeting the user's needs, a new mobility AT may need to be supplied, starting again from step 1.

6.3.4 Personnel involved in mobility AT service delivery

Personnel involved in mobility AT service delivery include:

- Those who identify and refer girls, boys, women and men who may need mobility AT.
- Clinical personnel who can assess the need for mobility AT and carry out the fitting.
- Technical personnel involved in product preparation, repair and maintenance.
- Personnel who provide training in the use of mobility AT.
- Mobility AT service managers.

A broad network of people at community level can help identify people with mobility problems and refer them to the mobility AT services. This includes families, community leaders, staff and volunteers from schools, churches, and health clinics.



The clinical and technical roles for the different categories of mobility AT can be carried out by different personnel who have had training in that AT, as follows:

- Walking aids may be provided by a wide range of personnel who may fulfil both the clinical and technical roles. This could include nurses, physiotherapists, prosthetist-orthotists, community based rehabilitation workers, community health workers and self-help group personnel.
- Basic and intermediate level wheelchairs are usually provided by trained clinical and technical personnel working as a team. Clinical personnel include physiotherapists, prosthetist-orthotists, community based rehabilitation workers, and other similar personnel (with required additional training). Technical personnel need a strong background in workshop skills, and additional training in wheelchair assembly, fitting, repair and maintenance.
- Prosthetic and orthotic AT is always provided by a qualified prosthetist-orthotists. These personnel are supported by technicians with specialist training.

User training for all mobility AT can be provided by the clinical and technical personnel noted above, and also by peer trainers. Peer trainers are experienced users of similar AT who share their knowledge and experience with others.

6.4 Facilities, tools and equipment needed to provide mobility AT

To provide mobility AT, personnel need appropriate facilities, tools and equipment.

Table 6.3 below provides a summary of what is needed for personnel carrying out the different steps of service delivery for different categories of mobility AT.

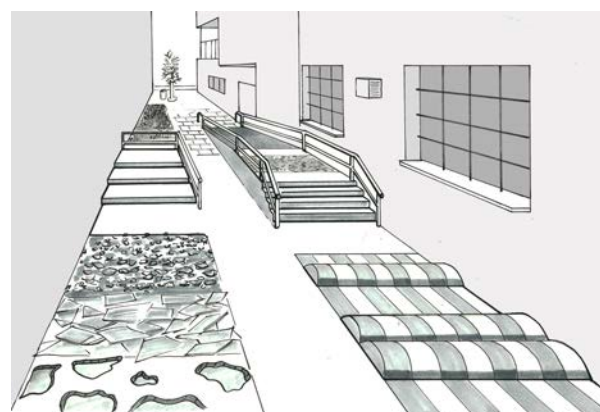
For intermediate level wheelchairs, prosthetics and orthotics the facilities, tools and equipment needed are quite extensive, requiring specialist knowledge to establish.

For all mobility AT services, user training involves the user learning how to be mobile with their AT in different environments. Mobility AT services therefore benefit from access to an area for mobility training. This could be:

- A purpose-built mobility training area
- Different nearby terrain and obstacles
- Portable mobility equipment

Some helpful features for mobility training include:

- Ramps, kerbs, steps and doorways
- Different surfaces, eg. rough, sandy
- Areas to practise transfers
- Parallel bars for walking training




In addition to the facilities described in Table 6.3, a dry, secure storage space is needed for all AT service delivery. This should be sufficient to store AT stock and materials, tools and equipment, as well as AT that has been prepared for a user and is waiting for fitting. As some mobility AT is bulky (for example wheelchairs), well planned storage is important.


Routine maintenance of tools and equipment is needed to ensure that services can be sustained and there are not lengthy interruptions due to equipment failures.



Table 6.3: Facilities, tools and equipment needed for mobility AT service delivery

| Facilities | Tools and equipment |
|--|--|
| <p>For walking aids</p> <p>Walking aids can be provided in a range of environments including wheelchair services, hospitals, community health clinics, community buildings or users' homes.</p> | <p>Assessment: Tape measure</p> <p>Product preparation, fitting and repair: Basic hand tools only are needed to adjust the length of walking aids and remove and replace rubber tips.</p> |
| <p>For basic level wheelchairs (either without, or with only minor modifications)</p> <p>Basic level wheelchair service delivery can be provided in a range of environments as long as the following is available:</p> <p>Assessment and fitting: A clean, quiet, private space.</p> <p>Product preparation and repair: Requires an organised workshop space. This could be a dedicated wheelchair workshop, space within a clinic area, a joint workshop with a prosthetic/orthotic service; or a temporary workshop space (for example in a community hall or health centre).</p>  | <p>Assessment: An assessment bed or firm padded bench is needed, along with foot blocks and a tape measure.</p> <p>Product preparation and repair: A workbench with a vice, along with a range of hand tools (which may vary depending on the products). A secure mobile tool box is useful for community service delivery.</p> <p>Fitting: Some hand tools may be needed to make adjustments during fitting.</p> |



| Facilities | Tools and equipment |
|---|--|
| Wheelchairs with supportive seating and/or customised pressure relief | |
| <p>Intermediate level wheelchair service delivery requires the same facilities as for basic level, with some additional considerations:</p> <p>More workshop space is needed as more fabrication is involved and some larger tools may be used (if production volume is high) such as a floor mounted band saw.</p> <p>More workshop storage space is needed for materials (such as sheets of foam, upholstery fabric) and postural support components.</p> | <p>Assessment: An assessment bed or firm padded bench, or a purpose built assessment seat. Assessment tools include foot blocks, tape measures and foam blocks.</p>  <p>Product preparation and repair: A workbench with a vice, along with a range of hand and power tools. An industrial sewing machine or access to a person/business that can sew upholstery and straps is important.</p> <p>Fitting: Some hand and power tools may be needed to make adjustments during fitting.</p> |
| Lower limb prosthetic devices and lower limb orthotic devices | |
| <p>Some steps of lower limb prosthetic and orthotic service delivery can occur in a range of environments. However, product preparation requires a prosthetic and orthotic workshop. The following summarises the facilities needed:</p> <p>Assessment and measurement: A clean, quiet, private space. For making plaster casts, a dedicated space with a sink with a plaster trap is needed to allow safe disposal of plaster.</p> <p>Product preparation and repair: A dedicated prosthetic and orthotic workshop space is needed for fabrication, modification, maintenance and repair.</p> <p>Fitting: A clean, quiet and private space close to a prosthetic and orthotic workshop to allow personnel to make modifications during fitting.</p> | <p>Assessment: An assessment bed or firm padded bench is needed. Assessment tools include tape measures, callipers, goniometers.</p> <p>Where a cast is required, plaster materials are needed.</p> <p>Product preparation, repair and fitting: To fabricate and modify devices, a range of specialist prosthetic and orthotic workshop equipment is needed.</p> |



6.5 Strategies to increase access to mobility AT in PNG

To meet the high demand for mobility devices in PNG, more basic and intermediate level mobility device services with trained personnel are needed. It is also important to remember that Identification, screening and referral are an important first step in the service system. This step helps to make sure people are directed to the appropriate service for them.

Below are some strategies to help increase access to mobility AT.

6.5.1 Increase identification and referral of people who need mobility AT

PNG stakeholders recommend raising awareness, and training personnel and volunteers in community and hospital based health and rehabilitation services as well as self-help groups to:

- Identify people with a mobility disability who need AT.
- Refer people who need a walking aid, wheelchair, prosthetic or orthotic device to the most appropriate service (depending on the person's need and location)

Ways to raise awareness are identified in chapters 5 and 7 and Annex 1. Recognising that research in PNG has shown that some groups of people are less likely to access mobility AT services, it is recommended that awareness messages represent equally male and female mobility AT users, and mobility AT users of all ages.

6.5.2 Increase basic level mobility AT service providers

Increase the number of service providers for walking aids and basic wheelchairs by:

- Broadening the number of organisations (such as community health clinics, hospitals, self-help groups, other disability service providers) providing walking aids.

This could both increase the number of 'access points' for walking aids for those who need them and lessen the work load for more specialist wheelchair, prosthetic and orthotic services.

- Enabling physiotherapy departments to establish basic wheelchair services by training physiotherapists and either linking with the National Orthotics and Prosthetics Service (NOPS) technical personnel or adding technical personnel to the department.
- Integrating training of wheelchair service delivery into the physiotherapy degree and community based rehabilitation courses. This could be done through a partnership with NOPS and the Divine Word University.
- Supporting other organisations in PNG that have clinical and technical capacity to provide wheelchairs by providing training and resources.

6.5.3 Increase access to intermediate level mobility AT services.

Increase the number of service providers for all mobility AT including intermediate wheelchairs, prosthetics and orthotics by:

- Recognising the lead role NOPS plays in mobility AT service delivery in PNG, and in particular specialist AT such as prosthetics and orthotics; and establishing one NOPS site in each Province.
- Building the capacity of other organisations (such as physiotherapy departments) to play a bigger role in providing walking aids, basic and intermediate wheelchairs. This will require training of clinical and technical personnel, as well as providing necessary facilities, tools and equipment.



The PNG National Orthotics and Prosthetics Service (NOPS): An Integrated Mobility Device Service

The Guidelines on the Provision of Manual Wheelchairs in Less Resourced Settings [1] and the Joint Position Paper on the Provision of Mobility Devices in Less Resourced Settings [3] recommend integrating wheelchair, seating, prosthetics and orthotics services.

This is an efficient use of resources as workshop and clinic facilities can be shared and personnel need similar skills. This approach is not new to PNG. NOPS, under the Department of Health is already the main service provider of all mobility devices in the country. NOPS services exist in each region, including in Lae, Mt Hagen, Port Moresby and Rabaul, with plans to expand the services to each province.

NOPS employs Prosthetist Orthotists, whose training qualifies them to provide prosthetic and orthotic devices. Additional in-country training in wheelchair service delivery has also been provided for these staff. This has equipped NOPS services with the capacity to provide basic level wheelchair services, and some NOPS services to provide intermediate level wheelchair services.

6.6 Trained personnel for mobility device services

All personnel (including volunteers and paid staff) need training to be able to safely and effectively provide mobility AT. All training needs to be delivered by a qualified trainer. The amount of training needed depends on the category of AT. The minimum training recommended is shown in Table 6.4.

As noted above, for successful wheelchair service delivery both clinical and technical personnel are needed. These personnel carry out different roles and work together as a team. It is not recommended that personnel with only technical or clinical training in wheelchair service delivery provide wheelchairs on their own.

Prosthetist Orthotists often work with bench technicians who carry out fabrication work under their supervision. Bench technicians are usually trained on-the-job, and are not qualified to carry out service delivery on their own.

Support for trained personnel in their workplace after training is very important. This includes supporting personnel with the tools and facilities they need to carry out their role; supervision and support; and opportunities for continued professional development.



Table 6.4: Minimum training recommended for mobility AT service personnel

| Role | Course and/or recommended content | Duration | Assessment |
|---|--|--|--|
| Identification and referral | Identification and referral workshop: Informal training delivered by service providers covering why identification of a child, youth, adult or older person with a mobility impairment is important; what mobility AT and associated services are available and where; how to refer; how mobility AT services are provided and the need to explain this to AT users so they know what to expect. | 1 day | Attendance certificate |
| Walking aid service delivery | PNG Walking Aid Training Package: Developed by Motivation Australia for PNG trainers the training covers how to safely and effectively provide a walking aid. | 1 day + supervised clinical practise. | Competency based assessment carried out by trainers. |
| Basic wheelchairs clinical role | WHO Wheelchair Service Training Package Basic Level (WSTP-B) [4] as well as any additional training needed to familiarise personnel with the specific range of available wheelchairs. | 5 days + minimum 3 days supervised practise with clients | |
| Basic wheelchairs technical role | Relevant parts of the WHO WSTP-B [2]; and practical training in the assembly, fitting, adjusting, maintenance and repair of the range of available wheelchairs. | | |
| Intermediate wheelchairs clinical role | WHO Wheelchair Service Training Package – Intermediate Level (WSTP-I) [3] as well as any additional training needed to familiarise personnel with the specific range of available wheelchairs and postural support devices. | 8 days + minimum 5 days supervised practise with clients | Competency based assessment carried out by trainers. |
| Intermediate wheelchairs technical role | Relevant parts of WHO WSTP-I [3]; and practical training in assembly, fitting, adjusting, maintenance and repair of available wheelchairs and how to fabricate additional postural supports. | | |
| Prosthetist role | Category II International Society for Prosthetics and Orthotics (ISPO) accredited training in lower limb prosthetics. | 18 months | Formal assessment through an ISPO accredited school. |
| Orthotist role | Category II ISPO accredited training in lower limb orthotics. | 18 months | |
| Managers of mobility AT services | In addition to generic management skills, managers of any mobility AT service need to have a good overall understanding of mobility device provision. This will help managers support service personnel; develop referral networks; advocate for the service; adequately budget for the costs of mobility device services; and make good procurement decisions. | | |



6.7 A range of mobility AT provided through a service

There are many women, men, girls and boys with mobility impairment living in PNG. In different locations people experience different conditions and climates. In some locations, such as the Highlands, the terrain is very hilly and it is hot and humid. People living near the coast experience sandy and salty conditions. The conditions and climate can affect how long a device will last (durability).

People also want to do different things with their wheelchair. Some people may use their mobility device at home, at work or school. Some people may spend a lot of time outdoors, and others may spend most of their time indoors. Some people might have to travel by bus.

The differences between people, their different disabilities, the different places they live in and the different things they need to do means that not everyone will be able to successfully use the same type of mobility device. It also means that each mobility device will need some adjustment to make sure it fits the user.

For these reasons, the availability of a range of mobility AT; and the provision of these AT through a service staffed by trained personnel is very important [1]. Having a range of different devices to choose from means users, with the help of service providers, can select the most appropriate mobility AT for them.

To realise the rights and meet the different needs of women, men, girls and boys with a mobility impairment in PNG, these Guidelines recommend the following mobility AT as a **minimum** range for provision in PNG which may be built on over time.

The devices are organised by category. For each category, it is recommended that a range including (but not limited to) at least one of each listed type of devices is made available in PNG. Materials needed to make or modify devices locally are also listed.

More detailed descriptions of these items can be found in section 6.7, and information about procurement can be found in Annex 7-11. As for other AT, well informed technical advice should also be sought when making procurement decisions.

Table 6.5 Categories of mobility AT recommended for use in PNG

| Category | At least one type of each of the following: |
|---------------------------|--|
| Walking aids | <ul style="list-style-type: none">• Adjustable height underarm crutches (child and adult size)• Adjustable height elbow crutches (child and adult size)• Walking frame without wheels (child and adult size)• Walking frame with wheels (child and adult size)• Walking sticks |
| Manual wheelchairs | <ul style="list-style-type: none">• Long wheel base rough terrain wheelchair• Short wheel base active wheelchair• Orthopaedic (push type) wheelchair• Children's wheelchair with postural support options• Materials for modification or to make additional postural supports including: foam, webbing, upholstery fabric, EVA, plywood. |



| Category | At least one type of each of the following: |
|--|---|
| Wheelchair cushions | <ul style="list-style-type: none"> • Flat foam cushion • Pressure relief cushion |
| <p>Components and materials to make lower limb prostheses including:</p> <ul style="list-style-type: none"> • Partial foot prostheses • Through ankle (ankle disarticulation) prostheses • Below knee (trans tibial) prostheses • Through knee (knee disarticulation) prostheses • Above knee (trans femoral) prostheses | <ul style="list-style-type: none"> • Low profile foot (for through ankle prosthesis) • Rubber feet • Solid Ankle Cushioned Heel (SACH) feet • Single axis feet • Endo-skeletal shank components • Single axis knee joint with adjustable stability and/or swing control • Polycentric knee joints (for through knee and above knee prostheses) • Materials to make prosthetic devices including: lamination materials (resin and fibreglass) or polypropylene of different thicknesses, strapping supplies (webbing and velcro of different sizes), fasteners (screws and bolts), EVA of different densities and thicknesses, plaster of paris and adhesives such as contact adhesive. • Consumables such as stump socks and stockinette |
| <p>Components and materials to make lower limb orthoses including:</p> <ul style="list-style-type: none"> • Foot Orthoses • Ankle Foot Orthoses • Knee Ankle Foot Orthoses • Knee Orthoses | <ul style="list-style-type: none"> • Free motion ankle joint • Dorsiflexion assist ankle joint • Free knee joint • Drop lock knee joint • Posterior offset knee joint • Materials to make orthotic devices including: EVA of different densities, polypropylene or copolymer, strapping supplies (webbing and velcro), fasteners (screws and bolts), stockinette and plaster of paris. |

For more detailed information to guide procurement of the above mobility devices, see Annex 7-11.



6.8 Description of different types of mobility AT

The following is a description of different mobility AT. Not all of the AT described below are on the recommended range of mobility AT in section 6.7. Other AT, not included in the recommended list, are included here as a reference for PNG stakeholders.

6.8.1 Walking aids

Crutches

There are two main types of crutches. These are underarm crutches and forearm crutches. Both may be used by people:

- Who need to reduce weight bearing on one leg temporarily;
- Who have only one leg;
- With difficulties walking; as a permanent walking aid.

Forearm crutches require the user to have more strength and balance than underarm crutches.

Used incorrectly, underarm crutches can cause problems such as shoulder pain. For this reason, forearm crutches are preferable for those who can use them.



Walking frames

Walking frames are more stable than crutches and provide more support when walking. They can be useful for people who are elderly and frail, have low strength or difficulty balancing.

Walking frames are not very easy to use on rough/uneven ground and are best suited to indoor use.

There are many different types of walking frames. Those without wheels are more stable than those with wheels.



Walking stick

A walking stick can be used to give a person some extra support and stability while walking. They are the lightest of all walking aids, and can be useful for people who have poor balance or need to reduce weight bearing after a minor injury. Walking sticks do not provide as much support as crutches or a walking frame.

There are different designs of walking sticks; which give different amounts of support. The choice of which stick to use depends on the needs and preference of the user and where they live and work.



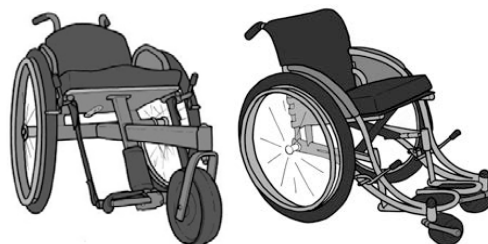
6.8.2 Manual wheelchairs

Wheelchairs

Long wheel base rough terrain wheelchair: a wheelchair available in a range of adult sizes that:

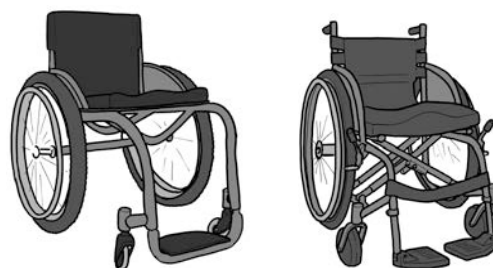
- Provides good postural support
- Is suitable for permanent wheelchair users who spend time moving outdoors over rural, rough or hilly terrain

Rough terrain wheelchairs may be three wheeled or four wheeled.



Short wheel base active wheelchair: a wheelchair available in a range of adult sizes that:

- Provides good postural support.
- Is suitable for permanent wheelchair users who spend time moving indoors or outdoors over relatively smooth ground.



Orthopaedic (push type) wheelchair: a wheelchair suitable for mostly indoor use by:

- People using a wheelchair temporarily (for example after surgery).
- People who use a wheelchair for short periods of time per day (for example to attend church, shops or social activities).

These wheelchairs are not suitable for outdoor use and will break down quickly if used regularly outdoors.



Adult supportive seating wheelchair: an adult wheelchair that can be easily adapted to meet the needs of adults who need extra postural support. This wheelchair may be one of the wheelchairs described above, as long it has the potential to be adjusted or modified to have extra support added to the seat, backrest and footrests.

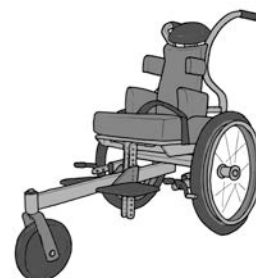


Children's wheelchair: a wheelchair available in a range of child sizes that:

- Provides good postural support.
- Is suitable for a child to independently propel indoors and outdoors.



Children's wheelchair with postural supports: A children's wheelchair available in a range of child sizes that can be readily adapted for children who need extra postural support. These may be three wheeled (as in the picture) or four wheeled.



6.8.3 Wheelchair cushions

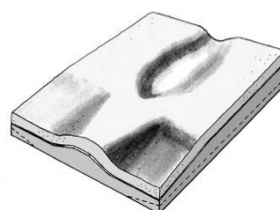
Wheelchair cushions

All wheelchairs should be provided with a cushion. The choice of the cushion depends on the physical needs of the user.

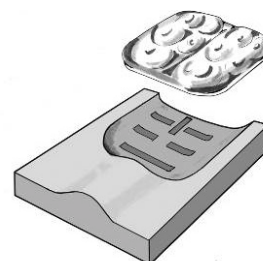
Flat foam cushion: A foam cushion designed to provide some cushioning and comfort for a wheelchair user who is not at risk of developing a pressure sore and does not need postural support from their cushion.

Pressure relief cushion: A cushion designed and proven to provide pressure relief for the prevention of pressure sores for people who are at risk of developing a pressure sore.

There are different types of pressure relief cushions available including contoured foam, air and fluid filled cushions. Most quality pressure relief cushions also provide some postural support.



Contoured foam cushion



Gel insert cushion with a contoured base



6.8.4 Components and materials for lower limb prosthetics

Overview

Lower limb prostheses are devices that replace the missing portion of a leg. A lower limb prosthesis may replace part of a foot, the whole foot, the leg below or above the knee. Common types of lower limb prostheses include:

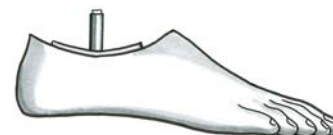
- **Above knee prosthesis (trans femoral):** For people who have an amputation above the knee.
- **Through knee prosthesis (knee disarticulation):** For people who have an amputation through the knee joint.
- **Below knee prosthesis (trans tibial):** For people who have an amputation below the knee and above the ankle.
- **Though ankle prosthesis (ankle disarticulation):** For people who have an amputation through the ankle joint. This is also sometimes called a Symes prosthesis.
- **Partial foot prosthesis:** For people who have part of the foot amputated.

Each lower limb prosthesis is made from a number of different components. There are different options for most prosthetic components. The choice depends on each person's physical needs, where they live, their lifestyle and cost. Some of the different types of components are described below, along with the benefits of each as they relate to the PNG context

Prosthetic foot and ankle

A prosthetic foot should absorb some shock, allow the user to walk as normally as possible, and be durable. There are different types of prosthetic feet. The most appropriate choice depends on the physical needs of the user, where they live and work and their lifestyle.

Low profile foot: Used for a person who has an amputation through or close to the ankle. The heel part of the foot does not come up as high as other feet so there is more room to fit prosthetic components without making the leg too long.



Foot with solid ankle: A basic and affordable foot. There is no movement at the ankle. This reduces moving parts (making maintenance easier), however can make it difficult for the user to walk over uneven ground or up and down slopes.



There are different types of solid feet. Two common types are:

- **Rubber feet (non SACH):** Designed for durability in tropical climates and where the user does not wear a shoe. Rubber feet are heavier than SACH feet (see below), and usually do not have a cushioned heel so there is less shock absorption.
- **Solid Ankle Cushioned Heel (SACH):** A solid foot with a cushioned heel, providing some shock absorption. The inside of the foot may be made from foam, wood and plastic, usually covered with polyurethane. Suitable for people with a low activity level and who will be walking over level ground. SACH feet should always be worn with shoes to protect them.

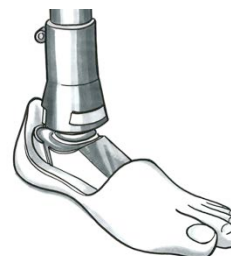


Single axis foot: Provides some ankle movement, providing more shock absorption. The user can walk with a smoother walking pattern, and more easily over uneven ground or up and down slopes.

The single axis foot is usually easier to use for a person with an above knee prosthesis, compared to a SACH foot.



Multi-axial foot and ankle: Gives the user more ankle movement than the single axis foot. This foot is suitable for people walking over rough or uneven ground. There are more moving parts, needing regular maintenance, so the user needs to be able to easily access the service. This device is more expensive than the other types of feet described above.



Dynamic response foot (energy storing foot): Provides more function for the user. Provides good shock absorption, stability over uneven ground and acts like a spring to push the foot off the ground for a more natural walking pattern. This foot can be damaged by use in sandy or dusty environments. It is generally a more expensive option than the feet above.



Socket and liner for lower limb prosthesis

The socket fits over the end of the user's limb (stump). Usually there is also a liner inside the socket, to make it more comfortable and protect the user's skin.

The socket and liner components are made for each user by a trained Prosthetist from specialist materials. Materials for the socket include fiberglass and resin; or polypropylene plastic. The liner is usually made from high quality polyethylene foam such as EVA. The shank components (see below) that are used can affect which materials are used to make the socket.

Shank and cosmesis

The shank connects the socket (for a below knee prosthesis) or the knee (for an above knee prosthesis), to the foot. The shank components need to be adjustable so that the shank can be aligned correctly for each user. The shank must also support the person's weight, activity level and be durable.

Two main types of shanks are described below:

Endoskeletal shank: A pole and adapters that join the socket or knee to the foot. The pole may be made of metal (for example aluminium or titanium) or polypropylene plastic. Most endoskeletal prostheses can be aligned to suit the client's walking pattern.

A separate cosmesis (cover) can then be made if the user would like the prosthesis to look more like a leg. Materials used to make a cosmesis may be soft foam (such as a pre-made foam cover, pelite or plastazote) or a hard plastic (such as polypropylene).



Exoskeletal shank: A laminated shell or solid wooden component joining the socket or knee to the foot. Compared to an endoskeletal shank, it is more difficult to re-align or adjust. There are fewer prosthetic feet or knees available that can be used with an exoskeletal shank; and it is heavier.

Does not need a cosmesis as this is built into the shank.



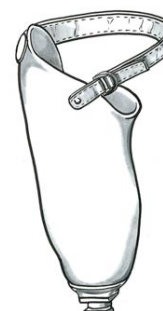
Suspension system for lower limb prosthesis

The suspension system holds the prosthesis onto the limb. There are different ways of doing this. The choice of suspension system depends on the type of socket used, the user's activities and shape of their limb. Two main types of suspension system are:

- Anatomical suspension (for example over the knee).
- External suspension (for example with a strap).



Anatomical suspension



External suspension

Prosthetic knee joint

People with an above knee amputation need a knee joint. The knee joint supports the user when they are standing and walking; and bends so that they can walk smoothly and sit comfortably. There are different types of knee joints. Three types are described below:

Basic single axis knee: A basic knee joint. Only suitable for a person with strong hip muscles and good balance; as the user must use their muscles to make the knee stable while walking. Some basic single axis knees will be able to be locked in a straight position for extra stability, however this can make normal walking more difficult as the knee does not bend.

Single axis knee with adjustable stability and/or swing control: More adjustability than a basic single axis knee. The amount of stability and how fast the knee bends can be adjusted to suit the user. It can also help to straighten the knee during walking. There are many different types of single axis knees that provide different variations of these functions and different levels of adjustment.



Polycentric knee: Works more like a real knee. It looks better when sitting, and is more stable when walking than other knees. This knee is good for people who have an amputation through the knee, very short stumps or have weak hip muscles.



Stump socks for lower limb prosthesis

Many prosthetic limbs require the user to wear stump socks on their limb. Stump socks help to adjust the fit of the socket. There should be a continuous supply of quality cotton socks for use with the prosthesis.

6.8.5 Components and materials for lower limb orthoses

Overview

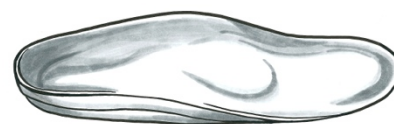
A lower limb orthosis is a brace, splint or other external device that supports the foot or leg to either prevent unwanted movement, assist movement or reduce pain.

Orthoses are either made for each user or are ready-made (pre-fabricated) and then adjusted and fitted for the user. Specialist materials and tools are needed to make orthoses, and personnel need a high level of training to do this work.

Some commonly used orthoses are described below.

Foot orthosis (FO): Used to support or realign a person's foot and/or change where pressures are placed on the foot.

May be used for people who have weak foot muscles; pain that limits their walking; diabetes or reduced feeling in their feet. Foot orthosis may be made from EVA, polypropylene or polyethylene.



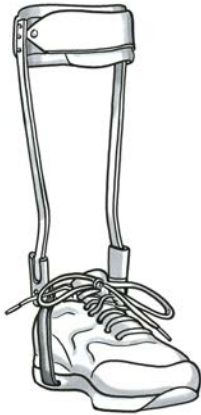
Knee orthosis (KO): Encases a person's knee joint to support it when walking where there is pain or injury.

May be made for each user or are ready-made (pre-fabricated) and then adjusted and fitted for the user. Depending on the needs of the user, the materials needed to make a knee orthoses include strapping, metal uprights and orthotic knee joints, polypropylene, polyethylene or neoprene.

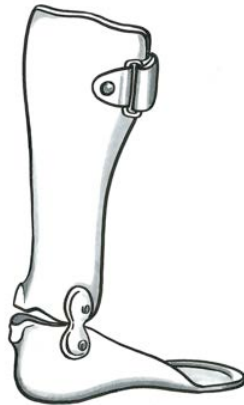


Ankle foot orthosis (AFO): Used to support a person's foot and ankle where the muscles are weak or do not work well. There are two main types of AFOs:

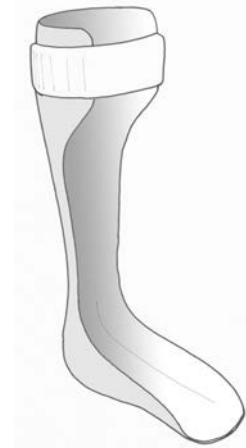
- **Metal AFO:** made of metal uprights, an orthotic ankle joint, a calf band and straps. The metal AFO is attached to a shoe.
- **Plastic AFO:** made of polypropylene, and shaped to the user's limb. A plastic AFO may be made with or without an orthotic ankle joint.



Metal AFO



Plastic AFO with ankle joints



Plastic AFO without ankle joints

Knee ankle foot orthoses (KAFO): Supports a user's leg where the muscles around the knee and ankle are weak or do not work well. As for an AFO, there are two main types of KAFOs:

- **Metal KAFO:** made of metal uprights, an orthotic knee joint, orthotic ankle joint, calf and thigh bands. The metal KAFO is attached to a shoe.
- **Plastic KAFO:** made of polypropylene, and shaped to the user's limb. The plastic KAFO may be made with or without an orthotic ankle joint included.



Plastic KAFO



Metal KAFO



6.9 References

- [1] World Health Organisation (WHO), *Guidelines on the Provision of Manual Wheelchairs in Less Resourced Settings*. Geneva: WHO press, 2008.
- [2] World Health Organisation, *Wheelchair Service Training Package - Basic Level*. Geneva: WHO Press, 2012.
- [3] World Health Organisation, *Wheelchair Service Training Package - Intermediate Level*. Geneva: WHO Press, 2013.
- [4] World Health Organisation. (2015, March) World Health Organisation. [Online].
<http://www.who.int/mediacentre/factsheets/fs300/en/>
- [5] World Health Organisation (WHO), *Joint position paper on the provision of mobility devices in less resourced settings*. Geneva: WHO Press, 2011.
- [6] United Nations (UN), *Convention on the Rights of Persons with Disabilities*, 2008.



Chapter seven: Effective Assistive Technology provision for persons with vision impairment

This chapter includes:

- An overview of why vision AT is important and an estimate of the number of people who have a vision impairment in PNG
- Information about what is needed to provide AT for people with a vision impairment
- Strategies to increase access to vision AT in PNG and recommendations for training personnel
- A recommended range of vision AT for PNG and a description of different types of vision AT

Persons with disabilities as experienced AT service personnel: Lucy's story



Lucy, 36 years, from East Sepik attended Faniufa Sacred Heart Primary School in Goroka. With the support of Mt Sion Centre for the Blind she learned to read and produce braille. Lucy is blind and says *"The Perkins Brailier was very useful. I used that machine because I can read and write and communicate with others. It's a success to me and I went to grade 10."*

When Lucy finished school, the Wewak Special Education Resource Centre (SERC) recruited her as a volunteer to assist in the Braille Unit and later as an employee preparing braille materials for teachers and teaching braille. Lucy has also helped develop a program for children with vision impairment to help prepare them for school. Her roles and

responsibilities at the Wewak SERC have increased over time. Now Lucy needs to use a computer at work. Lucy says *"The problem was I didn't know how to use a computer. A computer was important because I had to do letter writing but the computer was not accessible without any voice software installed. So Callan organised training on JAWS software. JAWS is very helpful to us so we can empower other people with vision impairment who are graduated from schools and now doing nothing. We can help them continue on with their education and find work. It is important for us nowadays in the modernised world. We need and want to attend more training on the technologies available – it is very important."*

Lucy is a DPO leader within East Sepik Disabled Person's Agency and regional representative on the PNGADP Women with Disabilities Committee. She contributed to a situational analysis for a Water, Sanitation and Hygiene programme to ensure the perspectives of persons with disabilities were included in future WASH programmes.



Terminology

| | |
|-------------------|--|
| Vision | The ability to see objects, light and colour |
| Vision acuity | A measure of the the ability of the eye to see detail. Vision acuity is usually tested with standardised eye charts. Using this test, a person with a score of 6/6* has normal vision. |
| Vision field | The total area that a person can see while their eye is directed straight ahead. For a person with normal vision, the total vision field with both eyes is approximately 180° to each side, and 155° up and down. |
| Visual function | The way in which a person uses the vision she or he has in their everyday life. For example, some people with low vision can often use the vision they still have if the environment around them changes such as having larger print to read or contrasting colour markers on the ground at school or work to move around. [1] |
| Refractive error | <p>The shape of a person's eye does not bend light correctly. This means their vision is blurry. The main types of refractive errors are myopia (near-sightedness), hyperopia (far-sightedness), presbyopia (loss of near vision with age), and astigmatism (distorted distance and near vision).</p> <p>Refractive error is common, and can usually be fixed with corrective glasses, contact lenses or refractive surgery. If corrected in time and by eye-care professionals, full development of good visual function is still possible [1].</p> |
| Vision impairment | <p>A limitation of one or more functions of the eye, which cannot be fully corrected by glasses or surgery. Vision impairment affects people in different ways. The most common vision impairments include difficulty in seeing clearly (vision acuity) and/or reduced area of vision (vision field). The severity of vision impairment also varies. For these Guidelines, two levels of vision impairment are used:</p> <ul style="list-style-type: none"> • Low vision • Blindness |
| Low vision | <p>Significantly reduced vision that makes it very difficult for the child or adult to learn or carry out some or all of their usual tasks/activities. A person with low vision will still have some functional use of vision for daily activities.</p> <p>Low vision includes people who have a vision acuity (after any possible correction with spectacles or surgery) of between 6/18 – 3/60; and/or a vision field of less than 20° from side to side.</p> |
| Blindness | <p>Almost or complete loss of vision. This means that a child or adult may need to use different ways to learn and carry out activities, compared with people who have normal vision. People who are blind may have some, or no perception of light.</p> <p>Children or adults who are blind include those with a vision acuity (after any possible correction with spectacles or surgery) less than 3/60; and/or field of vision less than 10° from side to side.</p> |

* In some countries, such as the United States, this is equivalent to 20/20 vision



7.1 The importance of vision AT

Vision plays an important role in helping girls, boys, women and men to be aware of and interact with their environment and other people. Vision helps a person to communicate, as they can see facial expressions and gestures; and can more easily follow group conversations. Vision also helps a person read printed text; find and identify things; and move safely about their home, outside, at school and work, and in the wider community.

The National Eye Plan Papua New Guinea [2] states: "Eye conditions not only affect people's quality of life, but have economic implications for the community and government, through loss of productivity, and eye and health care costs. A person who is vision impaired is twice as likely to suffer falls than those with normal vision, is four times more likely to have hip fractures, three times more likely to be depressed and has double the risk of early death (McCarty et al, 2001)."

More recent studies have found there are significant costs to the government, communities and individuals when vision impairment is not addressed or managed [3].

For people with a vision impairment, the use of AT can help maximise the person's ability to participate as fully in their family and community as possible. Also important are adaptive techniques (different ways of doing things) and accessible environments that take into account the needs of people with a vision impairment.



The AT needs of people with refractive error, low vision or blindness are very different. For these Guidelines, vision AT has been grouped into five (5) main categories: spectacles, also known as corrective glasses; optical AT; non-optical AT; orientation and mobility; and computer use. Table 7.1 below summarises these categories.

Table 7.1: Summary of four different categories of vision AT

| | Children and adults with: | | |
|-----------------------------------|--|--|---|
| | Refractive error | Low vision | Blindness |
| Spectacles | Help correct vision impairment caused by refractive error. | May be used as well as other AT to maximise vision. | |
| Optical and Non-Optical AT | | Helps improve what the person can see by making things bigger, brighter and bolder . | Helps the person use their hands and other senses, or adapt the way they do things. |
| Orientation and mobility | | Helps the person move around safely. The AT and techniques may be different depending on if the person has low vision or is blind. | |
| Computer use | | AT that helps the user use a computer in different ways. | |

Access to the right AT helps persons with disabilities exercise and enjoy their rights: Collin's story



Collin is 24 years old and lives in Goroka. He works at his father's Eastern Highlands

Coffee business where he dries, weighs and sells coffee for export. He is also enrolled with Mt Sion Centre for the Blind and Faniufa Sacred Heart Primary School as an adult because he wanted to finish high school. He is learning braille and finishing Grade 11.

When Collin was young he went to Ufeta Christian Academy where he completed Grades 1 to 7. He found learning hard and many tasks took him a long time to do because he could see very little. He did not know that he had vision impairment. It was not until he was an adult that he became aware of Mt Sion and the services that they could provide to help him continue his education and help him in his daily life. Collin is now determined to keep learning and fulfil his dreams.

He says: *"It's my right to have an education. At first I used glasses but they were not helpful enough and I used to take a lot of time to study. I now use a laptop to help me with braille, I also use NVDA and JAWS. I can now type up notes, exercises and assignments by myself. It (AT) helps me to study. I also use it (AT) to listen to music and play card games."*

"I want to study in Australia when I graduate from Grade 12 and get into private business when I come back" says Collin.

7.2 How many people with vision impairment need AT in PNG.

In PNG many people have problems with vision. The two most common problems are refractive error (vision is blurry) and cataracts (a

cloudiness within the eye) [4]. Both of these problems can be treated with spectacles or surgery. If not treated, people with refractive error, cataracts and other vision problems that could be treated, live with a vision impairment.

For some people, the problems with their eyes cannot be treated, or the treatment will not completely correct their vision. These people have a permanent vision impairment.

The number of people with a correctable or permanent vision impairment in PNG is high. A study [4] of people older than 50 years and living in PNG, found that 29.2% had low vision and 8.9% had functional blindness (complete loss of vision). Un-corrected cataracts and refractive error were the cause of vision impairment for 81% of participants in the study. For these people, their vision impairment could be corrected with spectacles or surgery. However, many people in PNG do not have access to the services or funding they need to correct their vision. This is creating a greater need for eye health services and vision AT.

Table 7.2 below gives an estimate of the number of people living in PNG with vision impairment. This includes people for whom spectacles or surgery would correct their vision impairment, those who need AT to assist with low vision, and those who need AT to assist with blindness.

These statistics have been drawn from:

- A 2010 global study that reported estimates of AT need for people with vision impairment including those in PNG [5].
- WHO data on the causes of vision impairment.

It is important to note that for some people, spectacles will not fully correct their vision. These people may use spectacles as well as other AT for low vision to maximise how much they can see.



Table 7.2: Estimate of number of people with vision impairment in PNG.

| | Estimated % of PNG population (2010)* | Estimated number in PNG (2015 Population 7.6M) | Number who can have vision restored by spectacles or surgery** | People with ongoing need for Vision AT |
|----------------------------------|--|---|--|--|
| People with vision impairment | | | | |
| Low vision | 5.8%*** | 440,800 | 339,400 (77%) | 101,400 |
| Blindness | 1%*** | 76,000 | 46,350 (61%) | 29,650 |

* From PNG estimates for 2010 on p 46 of Appendix B in Stevens et.al. [5]

**Estimated from WHO (2010) Global Data on Visual Impairments 2010. From <http://www.who.int/blindness/en/> (Blindness – correctable for cataract, glaucoma and uncorrected refractive error (61%); Low Vision – (as for blindness 77%)) Figures 2B & 2A.

***An average percentage has been drawn from the range

7.3 AT services for people with vision impairment

7.3.1 Overview of vision AT services

Many different organisations and their personnel are involved in providing both eye health and AT services for people with vision impairment. Eye health services are important in ensuring that eye conditions that can be treated are identified and addressed.

AT services for people with vision impairment need to include identification of those with eye conditions or a vision impairment, screening and referral to the most appropriate eye health and/or AT service; services to provide corrective spectacles, low vision AT and AT for people who are blind.

Girls, boys, women and men, when first identified as having difficulty seeing, should ideally be assessed by a doctor and/or suitably qualified eye care worker. This assessment will identify whether the child or adult has an eye health problem that should be medically treated, and whether referral for vision AT is appropriate.

Girls, boys, women and men with refractive error will most likely have their needs met through the provision of spectacles. In PNG, spectacles are provided through eye care clinics.

Girls, boys, women and men with low vision are likely to need optical and non-optical AT, and may also benefit from computer use AT. Optical and non-optical AT could be provided through basic level eye care clinics, and other service providers such as Special Education Resource Centres.

Girls, boys, women and men who are blind will need different sorts of AT, including some specialist AT such as braille equipment and mobility canes. Their needs are more likely to be best met through services where staff have specific training and expertise in this type of AT.



7.3.2 Basic and intermediate level vision AT services

Table 7.3 provides recommendations for vision AT that can be safely and effectively provided by personnel with a basic level of training and vision AT that requires intermediate level service delivery.

This structure will help make sure the user receives AT that meets their needs as well as the training and follow up support they need to use it effectively. It is also to make sure eye health and safety issues are considered.

7.3.3 Providing vision AT through eight service delivery steps

Vision AT needs to be provided through a service delivery system. The details of each step in the service delivery will vary depending on the AT. For example, product preparation is minimal for some vision AT (such as a monocular); however quite involved for other vision AT (such as custom made spectacles).

Table 7.3: Examples of vision AT that could be provided at basic and intermediate service levels

| | | Basic service level | Intermediate service level |
|---------------------------------|----------------------------|---|--|
| Spectacles | | - | Ready made and custom made spectacles. |
| Optical | | Magnifiers such as hand held, stand or spectacle magnifiers | Monocular (one eye) and binocular telescopes, electronic magnifiers |
| Non-optical | Changing light | Reading lamp, sunglasses, hat | Glasses with light filters and/or polaroid coating |
| | Reading and writing | Reading and writing stand, reading slit, writing and signature guides, bold lined paper and felt tipped pens, enlarged print books | Document and book players, braille equipment to enable people to write, read and print and braille |
| | Daily activities | High contrast non-slip mat, tactile markers and labels, talking devices such as clocks, watches, tape measures, big text and button phones, coin/paper money organisers | Braille watch or clock |
| Orientation and mobility | | Identification cane, support cane | Long mobility cane (with various tips) |
| Computer use | | | Big keyboards and/or keyboard stickers, screen magnification, screen reader software |



7.3.4 *Personnel involved in vision AT service delivery*

Personnel involved in vision AT service delivery include:

- Those who identify and refer girls, boys, women and men who may need vision AT.
- Clinical personnel who can assess the need for vision AT.
- Technical personnel involved in product preparation, repair and maintenance.
- Personnel who provide training in the use of vision AT.
- AT and eye health service managers

Some of these personnel are likely to specialise in particular categories of vision AT. For example, different personnel are likely to provide spectacles than those supporting persons with vision impairment to access computer technology.

The National Eye Plan [2] outlines the personnel involved in eye health care and spectacles service delivery in PNG.

Some of these personnel may also provide optical and non-optical low vision AT (with additional training). They also play an important role in identifying and referring children and adults who may need other vision AT such as orientation and mobility and computer use.

These personnel include:

- **Primary eye care workers (refraction):** Based in clinics, health centres, regional and rural health posts and communities these certificate trained staff carry out eye examinations, identify eye health and vision problems, provide ready-made glasses and refer to other services such as the eye clinic and other AT services.
- **Ophthalmic Clinicians:** Nurses and Health Extension Officers with post-graduate training in eye care, these personnel provide diagnosis and non-surgical treatment of eye health and vision problems. They also provide ready-made and custom-made spectacles.
- **Spectacle Technicians:** These personnel are an important part of the spectacles

supply network. They measure people's faces, make custom-made spectacles including cutting, grinding, shaping and polishing lenses and advise them on using and looking after their spectacles.

- **Ophthalmologists and Ophthalmology Registrars:** Specialist doctors with additional training in diagnosis, medical and surgical treatment of eye disorders, ophthalmologists and ophthalmology registrars play a key role in treating conditions that cause vision loss. They are an important part of an overall eye health and vision AT system.

In addition to the personnel identified in the National Eye Plan [2], a range of personnel in PNG do and could carry out aspects of vision AT service delivery. This includes Community Based Rehabilitation workers, teachers and community health care workers.

More information about the minimum training recommended to provide the different categories of vision AT can be found in section five of this chapter.

7.3.5 *Facilities, tools and equipment needed to provide vision AT*

To provide vision AT, personnel need appropriate facilities, tools and equipment. Table 7.4 below provides an overview of what may be required for personnel carrying out the different steps of service delivery including screening, assessment, product preparation and user training.

In addition to these facilities described, a dry, secure storage space is needed for all AT service delivery to store AT stock and materials, tools and equipment, and AT that has been prepared for a user and is waiting for fitting.

Maintenance of tools and equipment is important to ensure that services can be sustained.



Table 7.4: Facilities, tools and equipment needed for vision AT service delivery

| Facilities | Tools and equipment |
|--|---|
| For spectacles | |
| <p>Spectacles can be provided in a range of environments including; eye clinics, health care services, community buildings or users' homes, as long as the following is available:</p> <p>For assessment and fitting: A clean, quiet and private space, with good, consistent lighting.</p> <p>For product preparation and repair: Custom spectacles need to be fabricated (made) in a dedicated workshop. Other preparation and repairs can occur in most environments.</p> | <p>Assessment: Fully trained ophthalmic clinicians and others use a variety of assessment tools and equipment for a full eye assessment to check eye health (to identify any eye health problems that should be addressed), and test vision (to decide what strength spectacles may be needed for each eye).</p> <p>The World Health Organisation Low Vision Kit is an assessment tool designed for use in a range of settings by trained personnel (such as teachers, CBR workers, health-care workers) to test for impaired vision and carry out a functional vision assessment [6]. The kit includes a pinhole mask, e-card vision tests and accompanying manuals.</p> <p>Product preparation and repair: Ready made glasses require no product preparation. Making custom lenses requires specialist equipment to cut, grind and polish the lenses. General repair to spectacle frames can be done with simple hand tools such as precision screwdrivers.</p> |
| For optical and non-optical AT | |
| <p>Optical AT can be provided in a range of environments including: eye clinics, health care services, community buildings or users' homes, as long as a clean, quiet, private space, with good lighting is available.</p> <p>If AT is for a specific environment i.e. school, work, home etc. then assessment, fitting and training in this environment can be useful.</p> | <p>Assessment and selection: Ideally, optical AT would only be recommended after a full vision test (see above) by personnel qualified and equipped to carry this out.</p> <p>A range of different optical and non-optical AT that the user can trial will help with assessment and selection.</p> <p>Product preparation, fitting and repair: Basic hand tools only are required.</p> <p>Product preparation, fitting and repair: Basic hand tools only may be required. Some Braille equipment may require the use of computer.</p> |
| For orientation and mobility AT | |
| <p>Orientation and mobility AT devices can be easily provided in a range of environments, as long as a clean, quiet, private space is available. User training in the environment in which the user will use their cane is very helpful.</p> | <p>Assessment: Tape measure (to measure height of user to provide correct length cane).</p> <p>Product preparation, fitting and repair: Basic hand tools only are required.</p> |
| For computer use AT | |
| <p>Computer use AT can be provided in a range of environments, as long as a clean and quiet space is available.</p> | <p>Assessment and selection: Access to some different options that the user can trial will help with assessment and selection.</p> <p>Product preparation, fitting, repair and user training: Access to a computer with appropriate software is needed.</p> |



7.4 Strategies to increase access to vision AT in PNG

7.4.1 Increase identification of girls, boys, women and men with vision impairment

PNG Stakeholders recommend raising awareness at community level in order to increase identification and referral of girls, boys, women and men with vision impairment to the appropriate services.

Community groups that could assist in identifying and referring include community and hospital based health and rehabilitation services (including doctors, nurses, physiotherapists, community based rehabilitation workers), teachers, church groups and self-help groups.

Clear community level information about vision impairment and vision AT should include:

- The importance of referring as soon as a problem is identified.
- Who to refer to when a problem with vision is identified.
- The availability of health and vision AT services that could assist.
- More awareness raising ideas have been identified in Annex 1: Advocacy and awareness raising.

Lack of awareness, early identification and screening deprive children with disabilities from their right to an education: Smith's story



Smith is 17 years old and lives near Kimbe in West New Britain with his parents and sisters. When he was three, he had an accident while playing, which damaged his eyes. He has very little sight, and

sees only light. Even though Smith's parents took him to the closest hospital, there were no trained personnel to assess him. His family did not have the money to take him to Goroka for help.

As a result, Smith did not go to school. His father Philip says *"I thought it would be good if Smith could go to school but how would he write?"* Smith or his father had never heard of AT like braille that could help Smith at school. It was only one year ago that Smith heard about Callan Services. Smith says *"I am excited about joining Callan and going to their school in Kimbe. I want to learn numbers and the alphabet. I would like to use a computer."*

Smith says *"Before Callan, I spent time with my neighbours. I talk to the younger children not at school. I listen to the radio and I like to hear people reading. In the village I sit close to people reading the paper so I can hear what the paper says."* Smith also likes to use his hands. He cooks with his mother and works with his father to build things such as boxes, stools and tables. In the evenings he goes out with his friends and walks around his village very confidently



7.4.2 Increase the number of service providers able to provide basic and intermediate level vision AT

Vision AT services are currently very limited in PNG. The capacity of existing services providing spectacles is limited by the number of trained personnel, as well as funding to procure spectacles. There is limited access to the other types of vision AT.

To meet the high demand for vision AT in PNG, there is a need for more vision AT service providers with trained personnel. This will require commitment from all stakeholders, investment in training as well as strengthening and establishing services.

Some specific strategies to increase the number and geographical spread of vision AT services are outlined below for each of the different vision AT categories.

7.4.3 Increase access to spectacles, optical and non-optical AT:

- Increase the national network of eye clinics staffed with primary eye care workers who can provide spectacles and optical and non-optical AT through eye clinics. Note that the National Eye Plan [2] recommends training at least 10 primary eye care workers per annum, to deploy a total of 120-200 throughout PNG.
- Include in the training of primary eye care workers and eye nurses a short course in basic and intermediate level optical and non-optical vision AT (specifically use of spectacles with light filters and polaroid coating) service delivery.

7.4.4 Increase access to basic level optical and non-optical AT for people with low vision:

- Develop modular courses in basic level vision AT service delivery (see Table 7.6) and run these courses for ophthalmic clinicians, refractionists, special education teachers, community based rehabilitation workers, community health workers.

This includes, and is not limited to, formalising a Certificate of Eye Care to provide health workers with skills in basic eye examination and simple refraction;

- Increase government funded human resource allocation for eye clinics, special education programmes and services providing centre based and community based rehabilitation;
- Include the provision of basic level vision AT as part of the role of all eye clinics, special education resource centres, rural health posts and community based rehabilitation services.

7.4.5 Increase access to braille, orientation and mobility, and computer use:

- Identify and strengthen at least 2-3 service providers in PNG able to provide specialist vision AT service delivery including Braille, orientation and mobility, and computer AT;
- Increase the human resource capacity of existing centres in PNG providing instruction in Braille reading and writing to make sure there are opportunities for all people, children (in particular), with very low vision or blindness to access this AT.
- Develop a PNG specific course to teach trainers of Orientation and Mobility skills training for people with very low vision or blindness; train rehabilitation personnel from identified specialist vision impairment services in this course.
- Develop a PNG specific course to teach trainers in computer use for people with vision impairment, potentially drawing on on-line courses in specific software; train and equip personnel with the necessary pre-requisite computer skills to be based at identified specialist vision impairment services.



Table 7.5: Recommended service delivery level for different vision AT

| Type of Vision AT | Basic | Intermediate |
|---|-------|--------------|
| Spectacles | ✗ | ✓ |
| Basic optical and non-optical vision AT | ✓ | ✓ |
| Orientation and mobility: | ✗ | ✓ |
| • Identification and support canes | ✓ | ✓ |
| • Mobility cane | ✗ | ✓ |
| Computer use | ✗ | ✓ |

7.5 Training of personnel involved in vision AT service delivery

As highlighted in the strategies above, successfully providing AT for girls, boys, women and men with vision impairment relies on personnel trained in the different categories of vision AT. The amount of training needed varies, depending on the AT.

These Guidelines recommend that personnel providing each of the following categories of AT receive at least the minimum training described below. For most personnel, this training would supplement existing training.

With the exception of training for ophthalmic clinicians, training recommended is not currently available as a formal course in PNG. The development of PNG specific, in-country training for AT personnel was highlighted as a priority by stakeholders during consultations for these Guidelines.

Following training, support for trained personnel in their workplace is essential. This includes supporting personnel with the tools and facilities required to carry out their role; clinical and technical supervision and support; and continued professional development.

Table 7.6: Minimum training recommended for vision AT service personnel

| Category of AT | Course and/or recommended content | Duration | Assessment |
|--|---|----------|------------------------|
| Identification, screening and referral (for all vision AT) | <p>In-country training provided for community or health workers with some basic eye and vision training. The training should include:</p> <ul style="list-style-type: none"> • How and why it is important to identify a person with a vision impairment at any age; • Simple ways to identify someone with a vision impairment and where to refer them for further assessment. | 1 day | Attendance certificate |



(Table continued from previous page)

| Category of AT | Course and/or recommended content | Duration | Assessment |
|----------------|---|---|---|
| Spectacles | Training for clinical personnel: Certificate in Eye Care for health workers delivered in country. This level of training could offer eye care workers with skills in basic eye examination and simple refraction including how to: <ul style="list-style-type: none"> Examine an eye, measure vision, detect abnormalities, and measure spherical refractive errors. Prescribe appropriate readymade spectacles. Refer appropriate cases to the nearest eye clinic. | 10 weeks made up of: Basic Essential Eye Care (3 weeks) Basic Refraction (3 weeks) Clinical Practice (4 weeks) | Written, verbal and clinical competency based assessment carried out by trainers (as determined by the training institution hosting the training) |
| | Training for clinical personnel: An Advanced Diploma in Eye Care is delivered through Divine Word University in partnership with Fred Hollows Foundation PNG. This course provides rural health nurses and health extension officers with skills in diagnosis, treatment and management of eye conditions, as well as refraction and prescription of a full range of spectacles. Graduates are equipped to be Ophthalmic Clinicians who work independently in hospital eye clinics and district hospitals, including skills in planning, developing and managing eye care services and information and financial systems. | 12 months full time course with supervised clinical practice. | Written and clinical competency based assessment as per University requirements. |
| | Training for technical personnel: Spectacle Technicians: In-country training course to provide technicians with skills in taking appropriate facial measurements, edging and fitting lenses, fitting and advising people on the use of their spectacles. Spectacle technicians can be non-medical personnel. | 2 weeks | Written and clinical competency based assessment carried out by trainers (as determined by the training institution hosting the training) |



(Table continued from previous page)

| Category of AT | Course and/or recommended content | Duration | Assessment |
|--|--|--|--|
| Optical and Non-Optical AT for people with low vision: Basic level | <p>Training: In-country training provided by a qualified person with experience in low vision AT in less resourced settings including:</p> <ul style="list-style-type: none"> • General introduction to eye-care and vision impairment including identifying when to refer to eye care specialists • Low Vision AT Basic Level: How to carry out service delivery with children and adults of all ages and gender, for recommended low vision AT, including assessing the user's needs, identifying the most appropriate AT, training the user how to use the AT, providing follow up and support as needed. • Working with children and adults of all ages and gender and their families with low vision to plan simple adaptations to their environment to improve function. | 5 days + minimum 3 days supervised practise with clients | Competency based assessment carried out by trainers (as determined by the training institution hosting the training) |
| Optical and non-Optical AT for people with low vision: Intermediate level | <p>Pre-requisite: Basic level training described above</p> <p>Training: In-country training provided by a qualified person with experience in low vision AT in less resourced settings covering intermediate level low vision AT (excluding braille) for children and adults of all ages and gender.</p> | 2 days + minimum 1 day supervised practise with clients | |
| | <p>Braille teachers: Braille teachers need to be confident reading and writing in braille, and also need to be good at teaching others. They also need a good understanding of vision impairment. In PNG many braille teachers have become braille teachers through on-the-job practice. No specific recommendations are made in these Guidelines for standardising training for braille teachers, however this is something that could be further discussed by stakeholders.</p> | | |



(Table continued from previous page)

| Category of AT | Course and/or recommended content | Duration | Assessment |
|------------------------------------|---|---|---|
| Orientation and mobility AT | In-country training for orientation and mobility trainers, provided by a qualified trainer including sensory and spatial awareness, searching skills (locating items or places), moving independently (including, crawling, rolling, walking), using another person to move about, protective skills (providing added safety in unfamiliar areas), cane skills: ways to clear a path and locate objects along the way. | 2-4 weeks (depending on content) followed by supervised practise [7] | Competency based assessment carried out by trainers (as determined by the training institution hosting the training) |
| Computer use | <p>Pre-requisite: Demonstrated skill in Information Communication Technology (ICT) including how to install, configure and maintain software.</p> <p>Training: In-country training supported by a qualified person; and making use of available on-line courses for specific software. Training to include:</p> <ul style="list-style-type: none"> • General introduction to eye-care and vision impairment including identifying when to refer to eye care specialists • Recommended computer use AT including methods for screen magnification and screen reader software • How to carry out service delivery for computer use AT with people with vision impairment, focusing on assessing the user's needs, identifying the most appropriate computer use AT, setting up this AT for the user, training the user how to use the AT, providing follow up and support including resolving issues relating to hardware of software. | Length of training dependent upon the scope of screen magnification and screen reader software. | Before providing any specific software, the computer use AT service provider should be able to demonstrate full competence in installing, configuring and updating that software. |



(Table continued from previous page)

| Minimum training for managers of services | |
|---|--|
| All vision impairment AT | In addition to generic management skills, managers of any service providing vision AT need a good understanding of eye care and different low vision/blindness AT provision. This understanding will assist managers to ensure there are systems in place to identify and refer any client who may benefit from medical eye care; support service personnel; build referral networks; and make good procurement decisions. |

7.6 A range of AT for people with vision impairment provided through a service

There are many different types of AT that can assist people with vision impairment. Which AT is most useful for each person will depend on the type of vision impairment they have, their lifestyle and activities, the environment in which they live, and their own personal choice.

People with vision impairment often use a number of different AT, separately or together different activities. The AT they use may change over their life time, because their vision may change, and the activities they are doing change. For example, AT that a child with a vision impairment may use at school may be different to the AT they use as an adult at work.

To meet the different, changing needs of each person with a vision impairment, it is important to have a range of different AT available, that can be selected by the user with the support of a trained service provider. People with vision impairment also need support in learning how to make the best use of their AT. For example, using a mobility cane to move about indoors and outdoors is a skill that requires a lot of training and practise. As activities change, people with vision impairment may need further support and training to meet their changing needs.

To meet the different needs of women, men, girls and boys with vision impairment in PNG, and taking into account the capacity of existing

vision AT services, the following AT for vision impairment are recommended (see Table 7.7).

The AT is organised by category. For each category, it is recommended that **at least one** of each listed type of AT is made available in PNG to create a minimum range that may be built on over time. This list has been developed through consultation with stakeholders in PNG. The list has also been guided by work of the WHO and the International Agency for the Prevention of Blindness (IAPB) in developing a list of priority AT products.

More detailed descriptions of these items can be found in section 7.7, and information about procurement of these items can be found in Annex 12-16. As for other AT, well informed technical advice should also be sought when making procurement decisions.



Table 7.7: Categories of vision AT recommended for use in PNG

| Category | At least one type of the following: |
|--------------------|--|
| Spectacles | <ul style="list-style-type: none"> • Ready made spectacles for short and long distance • Custom made spectacles (lens and frame components) |
| Optical | <ul style="list-style-type: none"> • Hand-held magnifier • Stand magnifier • Electronic magnifier • Telescope (monocular and binocular) |
| Non-optical | Changing light <ul style="list-style-type: none"> • Glasses with light filters and/or polaroid coating |
| | Reading and writing <ul style="list-style-type: none"> • Reading and writing stand (may be made locally) • Reading slit, writing and signature guides (may be made locally) • Braille equipment to read and write |
| | Daily activities <ul style="list-style-type: none"> • Talking watch or clock • Talking calculator |

For more detailed information to guide procurement of the above vision AT, see Annex 12-15.



7.7 Description of vision AT

The following provides a description of different vision AT. Not all of the AT described below is on the recommended range of vision AT in section 7.6 above. Other AT, not included in the recommended list, is included here as a reference for PNG stakeholders.

7.7.1 Corrective glasses

Corrective glasses

Spectacles (also called corrective glasses) are mainly used to treat refractive error. This includes myopia (nearsightedness), hyperopia (farsightedness), and presbyopia (loss of near vision with age). Spectacles can also help to correct astigmatism (distorted distance and near vision).

Spectacles may be:

- **Ready-made:** Spectacles that correct mild refractive errors including problems with seeing close and far. Each lens has equal power, which means the correction will be the same for both eyes.
- **Custom made:** Spectacles that are prepared for an individual user, by combining the frame and a lens that has been modified to suit the user's vision. Custom made spectacles can correct more significant refractive errors including astigmatism. The left and right lens can be different if needed.

Refer to the PNG Eye Care Catalogue for the suite of recommended spectacles available in PNG.

7.7.2 AT that improves what a person with low vision can see

Overview

'Optical' AT helps improve what a child or adult with low vision can see. The AT usually works by making objects, text or pictures appear larger through magnification. Optical AT should always only be prescribed after all possible correction with glasses and/or surgery has been provided. In PNG, however, services are not always available and it may be necessary to provide optical AT in the interim until the person can reach or be reached by an appropriate eye care service or personnel.

Different types of magnifiers include: Hand held magnifiers; stand magnifiers; spectacle magnifiers; telescopes; video magnifiers. Magnifiers can be described by:

- The size of the lens, which determines how much of an object the viewer can see at once
- The amount of magnification (how much larger than the original). For example: a 2x magnifier makes objects appear twice as large as they actually are.
- The focal length (distance from the lens to the object when the object is clearly in focus).

The choice of magnifier depends on the user's vision and what task they are trying to do. For example, some magnifiers are for reading and looking at close objects. Others are for seeing things that are further away such as signs. Tired eyes and other physical problems can happen if the user is straining to see. Some users may benefit from more than one type of magnifier, to enable them to carry out a range of different activities. Availability and cost are also important factors.



Hand held magnifiers

Hand held magnifiers are useful for reading or looking at objects close up. Most are quite small, and can be carried easily. Some examples of hand held magnifiers are shown below.

Magnification sheet: A convex shaped piece of plastic that magnifies text when placed over the top. Some magnification sheets are small enough to fit into a shirt pocket or purse. Others can be as large as a piece of paper.



Visulette: A dome shaped magnifier, which is placed directly onto the page. The user slides the visulette along as they read and the page/text stays in focus. Magnification is usually 2-3 x greater than the original.

The design of the lens enables extra light to be directed onto the text. This reduces the need for extra light from a lamp.



Hand held magnifier with or without light: A magnifying lens, which is held in front of or over the object or text to be viewed. The user adjusts the focal length by moving the magnifier closer to or further from the object or text.

The amount of magnification depends on the lens. The larger the area of the lens, the less the magnification. Some hand held magnifiers have an inbuilt light, which can make it easier to see. Some hand held magnifiers fold to protect them when stored or being carried.



Stand magnifiers

Stand magnifiers are magnifiers mounted on a stand, which is placed over the object or text to be viewed. The focal length is set by the stand. This means that the user's hands are free, so a stand magnifier can be a good option for a person who may want to use their hands for a task such as writing or sewing or who has difficulty using their hands.

Like other magnifiers, the magnification depends on the lens. Some stand magnifiers have an inbuilt light. Stand magnifiers tend to be larger than hand held magnifiers, and are not as portable (easy to carry around).



Spectacle magnifiers

Spectacle magnifiers are used to magnify objects, text or pictures that are quite close. The magnifier is clipped onto the frame of glasses. The advantage is that both hands are free, and the magnification is directed wherever the user is looking.



Telescopes

Telescopes can be used to view objects that are near, far away and anywhere in between. The lenses come in a range of different magnifying powers. The user puts the telescope up to their eye/s to view. Telescopes may be:

- Monocular – designed to be used with one eye
- Binocular – designed to be used with both eyes

Telescopes are useful for 'spot viewing'. For example, they can help a person with low vision read street and shop signs or see people across a room. They should not be used when the person is walking.



Video magnifiers

Video magnifiers can be used to magnify objects, text and pictures from two times up to seventy times (or more) larger. Like the magnifiers described above, video magnifiers may be hand held, or have a stand. They all require power, usually through a battery.

There is a wide range of video magnifiers, with many different features. Most can be adjusted for contrast, background colour, colour of text and brightness. Some are full colour, which is useful when colour is important (for example reading maps). Some systems work with a computer, with the enlarged image being projected onto a computer screen.

Choosing the right video magnifier requires a good understanding of the user's vision, tasks, home and work environment; as well as the range of available options. Video magnifiers are expensive, and therefore availability and cost are important factors to consider.

Some examples of video magnifiers are shown below.

Hand held video magnifier: Hand held magnifiers are portable, so that the user can always have it with them to read, write or view objects.

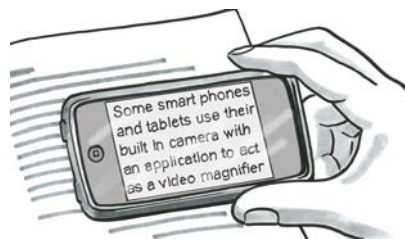
Some hand held video magnifiers also have a stand that can be used when the user is in one place; and can also be connected to a larger screen (for example a computer or TV).



Stand video magnifiers: These video magnifiers are mounted on a stand. The objects, text or writing to be viewed is positioned in front of / underneath the video lens. The magnified image is then seen on a computer screen. In the example in the picture, the video magnifier is facing the classroom blackboard. The information on the blackboard is then enlarged on a screen placed on the student's desk.



Mobile digital device such as a smartphone or tablet applications for magnifying: Some smart phones and tablets use their in-built camera with an application to act as a video magnifier. Most digital device products have these applications built in, along with other universal design (accessibility for all) features.



7.7.3 Non-optical: AT that change the environment or the way a task is carried out

Overview

Non-optical AT include a wide range of different AT that can assist a person with vision impairment. The following is a description of some commonly used devices that:

- Assist by changing the light;
- Assist the user to carry out activities that require reading and writing;
- Assist the user to carry out daily activities (at work, school, home and in the community)

Not all AT are useful for every person. The choice of AT depends on what activities are most important for the user, and how their vision impairment affects them.

Devices that help to change the light

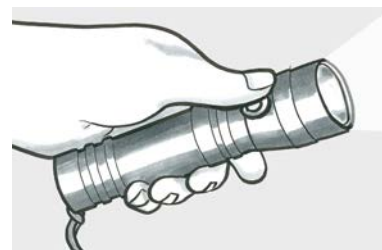
Increasing light, decreasing glare and filtering out specific aspects of light are different ways that may assist someone with low vision to see better. As always, the most appropriate light solution depends on the user's vision and what tasks they are trying to do. Some examples of basic devices are shown below.

Reading lamp: A standard reading lamp can help to illuminate objects, text or pictures, making it easier to see. A reading lamp could be used with a magnifier.

Ideally the lamp should use LED globes as these are brighter and the lamp will not become as hot. A solar powered lamp would be more useful where electricity is not reliable.



Handheld torch: A small torch that can be carried wherever the user goes can be very useful. Halogen torches are good as they do not leave any filament shadows, which can be distracting.



Sunglasses: Some people with vision impairment are very sensitive to bright light, or glare. For these people, sunglasses, particularly polaroid sunglasses, reduce the light / glare. This can help to reduce the incidence of pain or tired eyes caused by excessive light.

Sunglasses with filters: Some sunglasses are designed specifically for people with vision impairment, to filter out specific elements of light. These specialist sunglasses can be fitted over a pair of prescription glasses. Alternatively a tint can be added to the person's prescription glasses.



Hat: A sun hat or visor that protects the eyes from overhead lighting (sun, ceiling lights) that is distracting can be very useful for some people with low vision.



Reading and writing

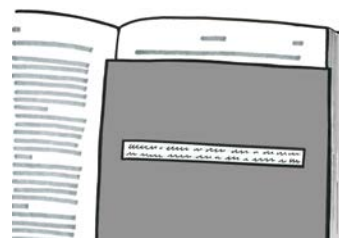
Reading and writing stand: This simple AT brings print closer to the viewer. Adjustment to vary the angle is very useful. These devices can be made in PNG.



Reading slit: This AT is often an A4 size sheeting with an open slit cut out of it. A person places the open slit over the text she or he would like to read. This AT the child or adult focus on the text and helps to reduce distraction.

Bold lined paper: Helps to guide a user with low vision when writing.

Felt tip pens: Felt tip pens produce a thicker line, which can be easier to see for someone with low vision.



Writing and signature guides: Plastic or cardboard writing guides to help keep writing on a page straight and neat. These come in different sizes. For example, large enough to cover an A4 page, or smaller to guide placement of a signature on a page or cheque book.



Document and book players: With new and emerging technology there are many different ways for text to be heard. Some are more or less accessible for people with vision impairment.

DAISY players are a commonly used example of document / book players designed particularly for people with vision impairment. DAISY stands for Digital Accessible Information System and is a digital talking book format that has advantages over audio books recorded on an audio CD or cassette. DAISY players are designed to be easy to navigate and access for people with vision impairment as they can easily go to a page or section they choose, bookmark their page and return to it later on. They are also easy to carry around. They can enable a child or adult with vision impairment access books, magazines and newspapers. Some devices also come with a recorder function to capture notes.



Most DAISY players need to be linked to a computer transfer books and documents to the player. Once the documents have been transferred, the player can be used independently of the computer. The battery life of DAISY players is around 4-5 hours.

Braille equipment: Braille is a special coding of text that uses six dots that can be felt. People who are blind use Braille to read. Braille has been used for many years. These days document readers are becoming more common, however many people who are blind still highly value the ability to read using braille. Learning to read and write in braille is an important part of the education of a child who is blind.

There is a range of equipment that is used to create and read braille text.

Braille can be written by hand, using a stylus in combination with a frame; with a braille typewriter or with a braille note taker. Standard text on a computer can be translated into braille using braille translation software. This can then be printed as braille using a braille embosser. Braille is printed onto specialist paper. Braille characters are larger than the standard text equivalent, so braille books can be quite large.

Alternatively, text can be translated into braille and sent from a computer or mobile digital device to a device called a 'refreshable braille display'. This displays the text as raised round-tipped pins that appear through holes on a flat surface. The braille reader is then able to read a section of the text and then refresh it to get a new section of text to appear on the display. Some refreshable braille displays also allow the user to input braille text.

Daily activities

There are many different AT that can be used by people with vision impairment to assist in carrying out daily activities. These AT are often used together with learning new techniques for doing things. Below are just a few examples.



Non-slip placemats can assist by keeping bowls and plates steady; and a **high contrast placemat** can assist a person with vision impairment to see their dishes during meal times.

Tactile (can be felt) markers or labels can be added to commonly used objects. For example a tactile marker on salt, pepper and sauce containers can help a person with vision impairment find the right container and a tactile marker on a t-shirt can help a person know which is the back or front so they can dress by themselves.

Talking devices, such as watches, clocks, calculators, tape measures allow a person with vision impairment to tell the time, do math, take measurements and so on.

Big text and button phones: Can enable a person with vision impairment use the phone independently. Other devices can be found with enlarged text or buttons – such as calculators, watches and clocks.

Coin sorters, money organisers: These devices sort currency to enable a person with vision impairment to find the correct change independently.

Large print calendars, diaries or telephone directories: By increasing the character size and minimising clutter, these items can assist people with low vision plan their day and find phone numbers and addresses.



7.7.4 Orientation and mobility: AT that help people with vision impairment move around

Overview

Many people with vision impairment use a white cane to help them to move safely and independently around. There are different canes, used for different purposes including:

- Identification cane
- Mobility cane

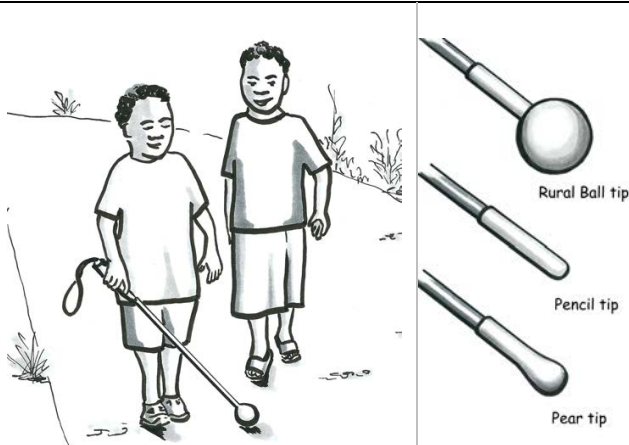
Canes can be either folding or non-folding. The choice of cane depends on the user's vision impairment, environment, lifestyle and choice. Selecting the right cane and learning how to use it should be done with the support of trained service personnel.

Identification cane: This cane is used to indicate to others that the user has vision impairment. It is not usually strong enough to provide support, or to be used to test surfaces or guide the user. The cane is always white with a red reflective tip for visibility.



Mobility cane: A mobility cane assists the user to safely find their way. The cane is used to scan and detect obstacles and surface changes. Training in how to use a mobility cane is very important.

Mobility canes are longer than identification canes, and the height needs to be adjusted to suit the user. Mobility canes can have different tips, which are best suited to different environments and tasks. Examples of some different tips include: pencil tip (good if a person can't move their wrist for a long time), pear shaped tip, rotating ball tip (rolls over cracks), rural ball tip.



Support cane: A support cane is used to provide physical stability for a person with vision impairment. The support cane is white, so that it also works as an identification cane. The support cane is not used as a mobility device.

7.7.5 Computer use: Assistive technology to help people with vision impairment use a computer

Overview

Computers have many features built into their operating system to assist people with vision impairments. As a first option some people may benefit from assistance in accessing these features.

Other software and hardware can also assist people who have low vision or are blind. Some software is open-source, which is usually free. Some major corporations have proprietary software and users must either purchase the software or pay a licence fee.

Setting up and adapting a computer for use by a person with vision impairment requires a good understanding of the person's vision, what they need to do on the computer, a good understanding of computers and the range of different hardware and software available to assist. Below are a few of the ways that AT can assist with computer use.

Large keyboard and/or stick on letters

The existing keyboard can be modified to increase access for a person with low vision by sticking larger letters, numbers and symbols onto an existing keyboard.

Alternatively, special keyboards with high contrast keys and in some cases better layout for people with vision impairment can be used.



Screen magnification software

Screen magnification software increases the size of the image displayed on the screen. Only a portion of the original screen image can be seen at one time.

Normally, the screen magnification follows the focus of attention, so that the area around the mouse pointer or highlighted item is magnified. Moving the magnified window to view other parts of the original screen image is done by moving the mouse or keyboard over the next image you want to view.



Screen reader software

Screen readers enable access to a computer and all the things it does when magnification no longer helps, or when a person with vision impairment has vision fatigue from reading large amounts of on-screen text.

A screen reading system for use with a computer includes a voice synthesizer and a screen reading program. The screen reading program translates the written text displayed on the screen for the voice synthesizer which then reproduces the text as speech. It is important to check that the software is the right software for the computer that is being used.

A screen reader will also read back other information that may be present on the screen such as menu options on a webpage. This allows the user to navigate between windows or programs. JAWS is one of the most commonly known screen readers. NVDA is another common screen reader program developed by NV Access, which is available for free from <http://www.nvaccess.org>.



7.8 References

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Annex 1: Advocacy and Awareness Raising Strategies

Introduction

Advocacy and awareness raising about these Guidelines were identified as important strategies to make sure the first ever National Guidelines on Provision of Assistive Technologies in PNG were implemented consistently across the country. As a result, stakeholders requested that an Annex be developed to guide advocacy and awareness raising actions.

This Annex aligns with and supports the draft PNG National Advocacy Plan for Disability [1], which was developed by PNG Assembly of Disabled Persons (PNGADP) under the auspices of the National Policy on Disability 2015-2025 [2]. The draft PNG National Advocacy Plan for Disability [1] aims to guide and coordinate advocacy actions to improve and recognise the rights of persons with disabilities.

The information and actions suggested in this Annex have come from the knowledge, experience and contributions of PNG stakeholders as well as findings of the PNG Equitable Access Research [3] and international experience.

Terminology

The following definitions for advocacy and awareness raising were agreed by stakeholders for the purpose of these Guidelines.

| | |
|-------------------|--|
| Advocacy | <p>Defined in the draft PNG National Advocacy Plan for Disability (2015) as: “The process of bringing about targeted change through an organised process of lobbying, collaboration and action. Advocacy is about making the changes to the wider policy, institutional and operational environment, more so than addressing needs of individual organisations.”</p> <p>It is the responsibility of all stakeholders to advocate for the change needed to implement these Guidelines.</p> |
| Awareness Raising | <p>Drawn from the Convention on the Rights of Persons with Disabilities [4] (Article 8: Awareness Raising): Awareness Raising Actions are those that:</p> <ul style="list-style-type: none">• Increase understanding by everyone in society/the public about the rights and dignity of persons with disabilities.• Promote positive perceptions about and towards persons with disabilities.• Help people, including persons with disabilities, recognise the skills, abilities and contributions of persons with disabilities.• Help remove stereotypes, prejudices and harmful practices relating to persons with disabilities, including those based on sex and age, in all areas of life. |



Advocacy

The advocacy messages and actions suggested in this section follow the same advocacy plan template of the draft PNG Advocacy Plan for Disability [1]. This advocacy plan supports the National Policy on Disability 2015-2025 [2] approach, which is that PNGADP and DPOs (including single line DPOs), across the country are responsible for leading all advocacy efforts relating to the rights of persons with disabilities.

| | Assessment and Action |
|---|---|
| What is the issue we are addressing? | <p>Access to AT is a human right</p> <p>Government has CRPD obligations to promote, protect and fulfil the rights of persons with disabilities. This includes obligations to provide appropriate AT within a service system by trained personnel.</p> <p>Lack of AT and AT services impacts on access to and participation by persons with disabilities in education, employment, community life and national development.</p> <p>Persons with disabilities are not being provided with information or choice about appropriate AT and AT services.</p> <p>Many donated AT are not appropriate. They can cause physical harm to users, are not being used and are creating unnecessary environmental waste for PNG.</p> <p>There are no policy or guidelines to guide the standards of AT products and AT services in PNG. There is also no funding for Guidelines implementation even though it is a priority under the National Policy on Disability 2015-2025 (NPD) [2].</p> |
| What are our Advocacy Goals? | <p>One: The DoH, DoE and DFCDR endorse the National Guidelines for the Provision of Assistive Technologies in PNG.</p> <p>Two: These Guidelines are integrated into government legislation, policies and processes (eg. annual activity/business plans, operations manuals and budgets)</p> <p>Three: These Guidelines are implemented by stakeholders and monitored for compliance by Governments at all levels and the NACD.</p> |



| | Assessment and Action |
|--|---|
| Which is the Policy or organisation we are targeting? | <p>DoH:</p> <p>National Health Plan</p> <p>National Health Service Standards</p> <p>NPD</p> <p>Priority 2.6.1 National Guidelines for All AT developed</p> <p>Priority 2.6.2 Regional, provincial and district based AT procurement, distribution, maintenance and training programs</p> <p>Priority 2.6.3 Develop Standard AT monitoring and record keeping system</p> <p>NDoH and DFCDR and Provincial/District Government assistance in funding for AT provision is sought as well as development partner funding.</p> |
| Who can help us (allies)? | <p>PNGADP members, National Advisory Council on Disability (NACD) Service Providers (NBDP), Provincial Governments, National Council of Women, development partners and others.</p> |
| What actions will we take? | <p>PNGADP will:</p> <p>Organise regular meetings with DoH, DoE and DFCDR to track the progress of Guidelines endorsement.</p> <p>As a member of NACD will ensure the Guidelines are an agenda item and will monitor how it progresses in NACD meetings and meetings of the Reference Group.</p> <p>Train DPOs in systemic advocacy for the Guidelines as part of their existing advocacy training so that DPOs can advocate to and within government systems about the Guidelines.</p> <p>Prepare tools for provincial DPOs and single line DPOs, to help them work with service providers to advocate to Provincial and District authorities. These tools can include:</p> <p>The purpose of the Guidelines;</p> <p>CRPD obligations; and</p> <p>Key areas of the Guidelines that need to be integrated into annual activity plans, budgets, operations manuals and procurement plans</p> <p>Consultations and meetings with allies and stakeholders to get their advocacy, compliance and funding support for the Guidelines.</p> <p>Use the media to advocate for the rights of persons with disabilities to access appropriate AT and AT services that comply with the Guidelines.</p> <p>Include costs associated with advocacy on the Guidelines into future funding proposals.</p> |



| | Assessment and Action |
|--|---|
| Who is in charge of this Advocacy effort? | PNGADP will lead by organising face to face meetings with Government authorities at all levels and issuing required letters. The Reference Group to the NACD will support advocacy on the Guidelines once they are connected up with the NACD. |
| Timeframes and other targets | This is an ongoing advocacy effort that will move from advocating for endorsement of the Guidelines to advocating for implementation, compliance monitoring and reporting on the Guidelines. It is expected that Government endorsement will be finalised in 2016. During this period PNGADP will progress work on all other actions. |

Awareness raising

Consultations for these Guideline and lessons from PNG and other countries suggest various awareness raising actions that can help improve AT provision [1] [2] [3] [4] [5] [6] [7] [8]. These have been included in the tables below. Please note that the information in the following tables is a guide and not prescriptive. It should be viewed as a menu of messages and actions that stakeholders may choose from to raise awareness for the target audience.

Just as the draft PNG National Advocacy Plan for Disability [1] suggests, it is recommended stakeholders take a rolling approach with awareness raising activities by being focused and prioritising their messages and actions, rather than raising awareness about everything at once. Awareness raising messages and activities can gradually increase over time. It is the responsibility of ALL stakeholders, in line with the CRPD, to raise awareness about the rights of persons with disabilities to appropriate AT provision, together with persons with disabilities, relevant DPOs and technical experts. Stakeholders responsible for awareness raising include:

- PNGADP
- DPOs, single disability line agencies and self help groups
- Users of assistive technologies
- Service Providers (NGOs, faith based groups, doctors and other health, education and community development personnel)
- National Government (DoH, DFCDR, DoE) as well as Provincial and Local Level Government (including hospitals and health posts)
- Development partners (donors, international NGOs, private sector, procurers of AT)



| Ideas for awareness raising with persons with disabilities, families and caregivers | |
|--|--|
| What do we need to raise awareness about? | <p>The right to 'appropriate' AT and AT services for persons with disabilities</p> <p>How AT can support persons with disabilities, families and carers</p> <p>These AT Guidelines and how to use the Guidelines to make sure they get quality and appropriate access to AT</p> <p>Types of AT that may help and where to find appropriate AT services and support in the local community, province and nationally</p> <p>Information about the costs of AT and accessing AT services and any opportunities for funding support</p> <p>How to respond to and change negative attitudes about using AT</p> |
| How can awareness be raised? | <p>Fact sheets in relevant language and accessible formats</p> <p>Face-to-face information sharing through peer to peer, meetings of support groups, walking around communities to share information and stories</p> <p>Sharing information by telephone (voice and text)</p> <p>Web based information and social media such as Facebook</p> <p>Using public media such as newspaper articles, radio announcements and interviews; running a media campaign; other media (e.g. documentaries)</p> <p>Drama and song</p> <p>Service directory/database of providers, which includes where they are, what services they have etc</p> |



Ideas for awareness raising **with Service Providers (mainstream and disability specific)**

(Government, NGOs, faith based groups, doctors, physiotherapists, nurses and other health, education and community development personnel)

| | |
|--|---|
| What do we need to raise awareness about? | <ul style="list-style-type: none">The right to 'appropriate' AT and AT servicesThe right to choose the AT and be part of the service delivery cycleHow AT can support users, families and carersSpecific impairments and types of AT that may helpThese AT Guidelines and the quality of AT services, products, training expected by providersReferral pathways – other support and service options available in the local community, district, province, nationallyTheir responsibility under CRPD and NPD to remove barriers that stop persons with disabilities having equal access to services.How to adapt services and information for persons with disabilities/usersTransparent procurement processes, costs and funding supportData collection, monitoring, evaluation and reporting expected by service providers relevant to AT provision |
| How can awareness be raised? | <ul style="list-style-type: none">Include persons with disabilities and their families in awareness activities and materialsFace-to-face information sharing including “word of mouth” communication networks in the community in relevant language and format eg. in local language, using pictures, in braille etcFact sheets and printed materials in local languages and accessible formatsRadio announcements and information sharingPeer support and group gatherings to share informationVia telephone and mobile phoneNewspaperRunning a media campaignDrama and songService directory/database of providers, which includes where they are, what services they have etcOther media eg. documentaries, share stories of user's experiencesWeb based information and social media eg. websites, facebook |



| Ideas for awareness raising with Government (National, Provincial, Local Level) | |
|--|---|
| What do we need to raise awareness about? | <p>Their commitments and obligations under the CRPD, NDP and other relevant policies</p> <p>The right to ‘appropriate’ AT and AT services</p> <p>What effective AT provision looks like – quality products, training, services, CRPD compliant policy/guidelines and maximum user involvement</p> <p>How AT can support users, families and carers</p> <p>How AT supports social and economic participation and productivity of users, families and caregivers</p> <p>These AT Guidelines and using the Guidelines as a tool to help decision making, planning and budgeting</p> <p>What support/service options are available or need to be established in the relevant local community, province, or nationally</p> <p>Costs and funding sources available</p> <p>Data collection, monitoring, evaluation and reporting expected under policies</p> |
| How can awareness be raised? | <p>Sending the Guidelines with a “how to use these Guidelines” note</p> <p>Press releases and information sharing through radio and newspaper</p> <p>Fact sheets and printed materials in local languages and accessible formats</p> <p>Face-to-face information sharing</p> <p>Via telephone and mobile phone</p> <p>Running a media campaign</p> <p>Service directory/database of providers, which includes where they are, what services they have etc</p> <p>Other media eg. documentaries, share stories of user’s experiences, highlight examples from the local area</p> <p>Web based information and social media eg. websites, facebook</p> |



Ideas for awareness raising with **Others (development partners, volunteers, local businesses, councils, committees)**

| | |
|---|---|
| <p>What do we need to raise awareness about?</p> | <p>PNG's commitment to collaborate and coordinate "appropriate" AT with partners by complying with the Guidelines</p> <p>The right to 'appropriate' AT and AT services, how AT can support users, families and caregivers and the impact of inappropriate AT</p> <p>What effective AT provision looks like – quality products, training, services, CRPD compliant policy/guidelines and maximum user involvement</p> <p>These Guidelines and the expectation that the Guidelines drive support from stakeholders</p> <p>The need to collaborate and partner with local partners eg. DPOs, single disability line agencies, service providers to identify AT and AT service needs</p> <p>The practise of handing out AT in the absence of a service and trained staff is not recommended</p> <p>Procurement checklists and recommendations in the Guidelines that identify how to support AT provision</p> |
| <p>How can awareness be raised?</p> | <p>Sharing the Guidelines with partners, including good practices and lessons learned</p> <p>Referring to these Guidelines in any documents between partners so that the Guidelines are adhered to (eg. design documents, contracts, monitoring and evaluation frameworks)</p> <p>Discussing the Guidelines in development partner meetings and using the Guidelines in meetings to assist negotiations about the type of support to be offered</p> <p>Having a user representative from a DPO present during negotiations and meetings so that they are part of discussions and decision making</p> <p>Fact sheets and printed materials in accessible formats</p> <p>Web based information and social media eg. websites, facebook</p> |



Annex 2: How the Guidelines align with PNG Legislation, Policies and Commitments

Providing appropriate AT is highlighted in many existing PNG legislation, policies, plans and guidelines. The following tables summarise the many commitments made by the PNG Government to improving AT provision. The table specifies the key reference, strategies and/or actions within each document. It also offers guidance on ways these National Guidelines on the Provision of Assistive Technologies in PNG supports stakeholders to deliver and report on these existing national policies, strategies, plans, commitments and legal obligations.



| Legal frameworks | | |
|---|--|---|
| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
| National Constitution | All citizens have the same rights, privileges, obligations and duties irrespective of race, tribe, place of origin, political opinion, colour, creed, religion or sex. | Access to appropriate Assistive Technology (AT) enables citizens to exercise their rights, privileges, obligations and duties. |
| Convention on the Rights of Persons with Disabilities | <p>Specific Articles include:</p> <ul style="list-style-type: none"> • Article 5: Equality and non-discrimination • Article 9: Accessibility • Article 20: Personal Mobility • Article 24: Education • Article 25: Health • Article 26: Habilitation and rehabilitation • Article 27: Work and employment • Article 31: Statistics and data collection • Article 32: International Cooperation • Article 35: Reports by States parties | <p>These Guidelines offer standards and recommendations relevant to Articles noted in the previous column and can support tangible results for PNG relevant to:</p> <ul style="list-style-type: none"> • Providing AT as a form of reasonable accommodation • Accessibility of public services and accessibility of AT for individuals at an affordable cost (Article 9); • Appropriate training of personnel in the provision of AT (Article 24, Clause 4; Article 26); • Improving access by persons with disabilities to needed, free and affordable health care and programmes, including early identification and intervention and services designed to minimise and prevent further disabilities (Article 25); • Collecting data sets and evidence through existing channels in relation to ATs and their impact (Article 31) • What sort of and how AT and AT services can be supported through development assistance to ensure development assistance meets international standards (Article 32) |
| Proposed new Disability Authority Act | National Policy on Disability 2015-2025 priority 3.1 specifically addresses a review of PNG legislation for CRPD alignment, enactment of a Disability Authority Act and an Authority to manage and administer policies, regulations and programs to promote, protect and enforce rights, needs and the best interests of persons with disabilities. | These Guidelines can be used to advocate for the new Act and/or legislation to promote/recognise access to appropriate AT. |
| National Health Administration Act (NHAA) 1997 | Mandates the development and implementation of the National Health Plan (government policy) and National Health Service Standards. | These Guidelines are a practical tool to assist the delivery of quality healthcare for PNG citizens with disabilities, particularly in the areas of quality, appropriate and effective AT service provision for those who require them. |

| National plans | | |
|--|---|--|
| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
| Vision 2050 | “Persons with disabilities should be empowered, their rights recognised and they should be included in the mainstream of social and economic life....if progress is to be made in addressing the rights and needs of people with disabilities, a strong partnership must be built with civil society including the churches, community-based organisations, development partners and in particular, disability organisations” (page 54). | These Guidelines are an important tool for empowerment because they provide persons with disabilities with the knowledge and evidence to advocate for and choose the AT and AT services they need/want so that they can participate in social and economic life on an equal basis with others. |
| PNG Development Strategic Plan 2010-2030 | Target by 2030: Persons with disabilities are integrated in the community with better access to services. This includes “developing and utilising preventative and proactive approaches to empower vulnerable people and effectively integrating them into the wider community. Such approaches include for example, the provision of relevant communication tools, rehabilitation and assistive devices and self-help mechanisms” (pages 116-117). | These Guidelines are designed to support improved access to services by persons with disabilities. They offer best practice service delivery models, and recommendations for AT that is appropriate in the PNG context to increase opportunities for users to be more integrated in the community. |
| National Public Service Gender Equality and Social Inclusion (GESI) Policy | “As the primary provider of goods and services to communities, the Public Service must consider the needs of people living with disabilities when designing and delivering its services. In the workplace, these inclusive and barrier free principles are essential to allow people with disabilities to recognise their potential as productive and fulfilled individuals” (page 23). | <p>The Guidelines, which were designed with persons with disabilities, their families and service providers, are designed to improve health and wellbeing in line with GESI principles and values by offering strategies for:</p> <ul style="list-style-type: none"> • Improving access to services by persons with disabilities through quality products, training of local personnel and increasing the number of service locations; • Quality AT products and services that can enable participation by a diverse representation of the community in public service policy and program design, implementation and monitoring; • Working closely with hospital and medical support services to improve their knowledge of quality AT provision and where to refer persons with disabilities for appropriate AT; • Providing reasonable accommodations such as AT which can assist to create equal access and employment conditions for people with disabilities. |

National plans *continued*

| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
|---|---|--|
| National Policy on Disability (NPD) 2015-2025 | “NPD...directs stakeholders to focus on developing standards, guidelines and mainstreaming” and integrated data collection (page 17) | The Guidelines offer recommended standards for AT provision, as well as data sets to incorporate into existing data mechanisms to assist national planning, budgeting, national and international reporting. These Guidelines can support PNG’s leadership in the region as they are the first of such Guidelines to be developed in the region. |
| | Strategy 1: Advocacy, Rights and Responsibilities | Strategy 1: The Guidelines provide PNGADP and the Disability Reference Group with a tool to support advocacy efforts in line with the National Advocacy Strategy so that people’s right to appropriate AT is recognised. |
| | Strategy 2: Improve Access to Quality Services and Support programs for persons with disabilities: | Strategy 2: A key output of the NPD is the development of these Guidelines. These Guidelines draw on lessons from previous assistive devices programs, provide guidance on reasonable accommodations and how learning and information materials can be made accessible, cost effective options and data collection recommendations relative to AT. |
| | Strategy 3: Development of an effective institutional, legal and financial framework for the Disability Sector: | Strategy 3: The Guidelines offer guidance on quality and standards of service delivery with respect to AT as well as identify options for increasing access points for AT provision. They provide information about the personnel required to provide different AT and how personnel can be trained. They also provide guidance to support donors and other stakeholders to support AT provision in line with these Guidelines and suggest ways to include aspects of the Guidelines into Government processes. |
| National Executive Council Directive 100/2015 | Endorses the National Policy on Disability 2015-2025, which mandates the development of these Guidelines. The NEC also directs various ministries to address rights and access to services in line with the CRPD including development of legislation, revisions to public utilities instruments, formation of disability committees, establishment of national orthotics and prosthetic as well as physiotherapy services, establishment of rehabilitation centres and CBR programs, ensuring accessibility of learning materials and technologies and endorsing sign language as the fourth official language in PNG. | These Guidelines support the implementation of the NEC Directives by offering recommendations for strengthening and establishing effective AT provision. The Guidelines offer recommendations for minimum training for service personnel, a recommended list of AT appropriate for the PNG context, strategies for improving service systems and data collection, strategies for increasing involvement of users in all aspects of AT provision and suggestions for improving governance and accountability of AT provision. |

| Sectoral policies and plans | | |
|---|---|--|
| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
| PNG National Health Plan 2011-2020 | Key Result Area 7: “Promote healthy lifestyles”; Objective 7.4: “Reduce morbidity and mortality from non-communicable diseases”; Strategy 6: “Improve the provision of disability aids / appliances, physiotherapy and community-based rehabilitation services”. | The Guidelines directly target improvements in the provision of aids/appliances, now referred to as Assistive Technologies (AT), including appropriate assessment, procurement, fitting, follow up and appropriate training of personnel in AT service provision. |
| National Health Service Standards | National Health Service Standards (Due for review in 2015-2016) make relevant reference to AT provision in chapters. For example, | The Guidelines offer best practice guidance on quality and innovative service provision for persons with disabilities to support delivery of NHSS. |
| | Chapter 1: Focuses on each level of health service and the equipment vaccines and drugs required/available. | Chapter 1: The Guidelines recommend appropriate AT, which could be incorporated into a priority AT list, in parallel to the essential medical devices list and they offer recommendations for procurement. |
| | Chapter 2: Quality Standards for Health Services in Papua New Guinea, specifically around standard of health care, facilities and equipment, qualified personnel and donated equipment aligning with policy. Reference is made to “special needs of disabled patients” | Chapter 2: The Guidelines offer: recommendations on increasing access points for AT which could then feed into the new standards (current standards due for review in 2015-2016); guidance on recommended AT for people who would benefit from AT in PNG; guidance on staff profiles and training options required to deliver quality AT service provision, which could support the Health Workforce Service Standards. These Guidelines can guide more specific reference to AT provision and persons with disabilities across all service standards in Chapter 2, specifically Standards 1 and 5. |
| | Chapter 3: Role delineation of Health Services Matrix references rehabilitation, CBR and future planning. Identifies AT/services at each level. | Chapter 3: Notes AT available primarily for mobility devices from level 3 and up. These guidelines could assist the new National Health Service Standards to identify what AT and services are/could be available at the other levels. |
| PNG Community Based Rehabilitation Network Strategy and Action Plan 2013-2016 | Core Strategic Objective: Effective Health Policies and programs. Activities include: <ul style="list-style-type: none"> • Advocate for the establishment of a rehabilitation and AT branch within NDOH • Develop a needs assessment process for AT in CBR programs • Develop standards for provision of AT • Supply an increased range of AT • Strengthen public private partnerships in AT | The development of these Guidelines is in and of themselves and indicator of achievement of this objective. The Guidelines offer strategies for advocacy, standards for AT provision, recommendations for an increased range of AT, and data sets to incorporate into existing or new data mechanisms to assist planning. |

| Sectoral policies and plans | | |
|--|--|---|
| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
| National Eye Plan Papua New Guinea 2013-2016 | Focuses on the need for appropriate low vision aids being integrated into existing training courses and the need for greater supply of glasses, CBR, research, M&E, and standardised data relevant to people with vision impairment. | These guidelines have the potential to supplement the eye care plan by going into detail about vision AT provision as well as access points for vision AT, necessary training for personnel and data sets to be collected through existing service systems. |
| Special Education Policy | Due for review in 2016. | <p>These Guidelines are designed to support the work of Special Education Resource Centres to provide appropriate AT services to enable access to education.</p> <p>They can also support the procurement of AT by the DoE to ensure the education system at all levels can offer appropriate reasonable accommodations for learners with disabilities.</p> |

| Regional and International Frameworks | | |
|---|--|--|
| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
| Pacific Disability Rights Framework 2016-2025 | <p>Purpose is to enable disability stakeholders to effectively use and implement the CRPD. Priority areas include:</p> <ul style="list-style-type: none"> Persons with disabilities are actively included in and able to contribute to national and regional development as equal partners; Strengthening leadership at all levels and the enabling environment; Mainstreaming disability into key central and sectoral Ministry policies, systems and services; Strengthening evidence base on disability through research, improved statistics and analysis. | <p>These Guidelines were developed with the active inclusion and contribution of persons with disabilities and with the intention to support implementation of the CRPD. They also offer recommendations for AT provision that will further enable persons with disabilities to be actively included in all aspects of society.</p> <p>The Guidelines offer recommendations for improving policy, legislation, programs, data collection and reporting relevant to the CRPD and AT provision.</p> <p>The Guidelines are also a tangible tool developed by PNG to support CRPD implementation and mainstreaming, which can be shared with partners in the region.</p> |
| Incheon Strategy to “Make the Right Real” for persons with disabilities in Asia and the Pacific | <p>“Persons with disabilities have access to... assistive technologies with reasonable accommodation provided, and taking into consideration the need to accommodate economic, geographic, linguistic and other aspects of cultural diversity, which altogether constitute a critical bridge to fulfilling their rights” (page 17 (k)). Each of the 10 goals is relevant to accessing AT.</p> | <p>These Guidelines support PNG’s achievement and reporting against many goals and targets of the Incheon Strategy. PNG is also a leader in this area being one of the first countries in the region to develop such Guidelines that incorporate AT for people with hearing, vision and mobility impairments and AT that aligns with international standards.</p> |
| Transforming our World: The 2030 Agenda for Sustainable Development | <p>Prioritises the active inclusion, participation and empowerment of persons with disabilities across all 17 Sustainable Development Goals (SDGs). It commits countries to take further effective measures and actions, in conformity with international law, to remove obstacles and constraints, empower and promote the social, economic and political inclusion of all people.</p> | <p>These Guidelines provide guidance for improving access to quality AT provision, for improving access to mainstream services such as education and health, and offers data sets to improve collection of quality, timely and reliable data required for reporting against the SDGs, particularly on AT provision and reasonable accommodations. The guidelines are also a tangible tool that shows PNG’s commitment to taking effective measures and action to conform with international law such as the CRPD.</p> |

Regional and International Frameworks *continued*

| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
|--|---|--|
| WHO global disability action plan 2014–2021: Better health for all people with disability endorsed at the 66 th World health Assembly (2014) WHO CBR Matrix | <p>The action plan has the following three objectives:</p> <ol style="list-style-type: none"> 1. to remove barriers and improve access to health services and programmes; 2. to strengthen and extend rehabilitation, habilitation, AT, assistance and support services, and community-based rehabilitation; and 3. to strengthen collection of relevant and internationally comparable data on disability and support research on disability and related services. <p>Provides an overall visual representation of CBR. AT is a priority element within the health component of CBR. Access to appropriate AT is highlighted as essential for enabling participation across all components of CBR including education, social, livelihood empowerment and health.</p> | <p>The Guidelines support PNG's achievement and reporting on achievement of the WHO action plan. PNG will also be a leader in this area being one of the first countries in the region to develop such Guidelines that incorporate AT for people with hearing, vision and mobility impairments and AT that aligns with international standards.</p> <p>CBR is a priority in PNG as stated in the National Policy on Disability 2015-2025. PNG stakeholders, particularly members of the National Board of Disabled Persons, are using the CBR Matrix as a framework for service delivery for persons with disabilities. These Guidelines draw on WHO evidence and guidelines and align with the goals and objectives of CBR.</p> |

Civil Society strategies

| Policy/Strategy | Reference in the document | How these Guidelines can support existing PNG commitments |
|--|---|--|
| PNG National Advocacy Plan for Disability (2015) | The draft PNG National Advocacy Plan for Disability (2015) was developed by PNG Assembly of Disabled Persons (PNGADP) under the auspices of the National Policy on Disability 2015-2025. The draft PNG National Advocacy Plan for Disability (2015) aims to guide and coordinate advocacy actions to improve and recognise the rights of persons with disabilities. | These Guidelines are a tangible tool to support the advocacy efforts of PNGADP. Annex 1: Advocacy and awareness raising provides more detail about the key messages and advocacy actions PNGADP plan to undertake to ensure the Guidelines are endorsed and implemented in PNG to support the rights of persons with disabilities. |

NBDP Strategic
Plan 2015-2020

NBDP's mission is to improve the quality of life and participation of all persons with disabilities...through the effective delivery of services across PNG. One key strategy of NBDP is to improve standards and distribution of AT, including by developing, endorsing and adopting these Guidelines.

These Guidelines have been developed together with NBDP members, who have articulated their commitment to using these Guidelines to strengthen AT provision, advocate for improved governance and national planning and budgeting for appropriate AT and to guide partnerships and priorities of development partners.

Annex 3: AT tools and resources

The following is a list of some of the resources have been or are being developed to guide AT provision and help develop and set standards for rights based AT provision. Other resources may also be available, and there is considerable work under-way to develop additional resources. It is recommended that stakeholders check the websites of these organisations and others regularly as more tools and resources will become available.

Mobility AT resources

- WHO Joint Position Paper on the Provision of Mobility Devices in Less-resourced Settings, <http://www.who.int/disabilities/technology/jpp/en/>
- WHO Guidelines on the Provision of Manual Wheelchairs in Less-resourced Settings, <http://www.who.int/disabilities/publications/technology/wheelchairguidelines/en/>
- Wheelchair Service Training Package - Basic level, <http://www.who.int/disabilities/technology/wheelchairpackage/en/>
- Wheelchair Service Training Package – Intermediate level
- Wheelchair Service Training Package – Management module
- Wheelchair Services Train of Trainers Package – being developed by WHO, USAID, Leadership, Management, and Governance Project of Management Sciences for Health, the International Society for Wheelchair Professionals and leading global wheelchair service providers, due in 2016.
- WHO Standards for Prosthetics and Orthotics Service Provision - being developed by WHO, in partnership with the International Society for Prosthetics and Orthotics (ISPO) and the United States Agency for International Development (USAID), due in 2016.
- The Swiss Agency for Development & Cooperation and Landmine Survivors Network Prosthetics And Orthotics Programme Guide: Implementing P&O Services in Low-Income Settings, http://www.ispoint.org/sites/default/files/img/programme_guide_final_version.pdf
- Motivation Australia Walking Aid Training Package – print and digital copies available in PNG through NOPS, PNGADP, Callan Services Network, Divine Word University; and Motivation Australia (email: info@motivation.org.au website: www.motivation.org.au)

Vision AT resources

The International Agency for the Prevention of Blindness' (IAPB) Low Vision Working Group has information about new resources available at <http://www.iapb.org/work-groups/low-vision>, including:

- Low Vision Curriculum for ophthalmologists, optometrists, ophthalmic mid-level personnel, educators/ teachers and rehabilitation personnel, intended for inclusion in undergraduate courses or as postgraduate “stand alone” courses.
- Low Vision National Focal Person Courses aimed at training National Focal Persons in development and management of low vision in their countries.
- Leadership course on low vision intended to be delivered at the regional level to meet the needs of the Global Action Plan – Universal Eye Health.



Hearing AT resources

- Callan Hearing Health Skills manuals, available in print format through Callan Services Network, PNG.
- World Health Organisation's Primary Ear and Hearing Care Training Resource: Basic Level.
- http://www.who.int/pbd/deafness/activities/hearing_care/basic.pdf?ua=1
- WHO CBR Promoting ear and hearing care through CBR:
<http://www.who.int/pbd/deafness/news/CBREarHearingCare.pdf?ua=1>
- Guidelines for Hearing aids and services for developing countries:
http://www.who.int/pbd/deafness/en/hearing_aid_guide_en.pdf?ua=1



Annex 4: International Organisation for Standardisation (ISO) standards

Introduction

The International Organization for Standardization (ISO) is responsible for developing standards for products, processes and systems (this generally does not include electrical or electronic products, processes and systems, which are the responsibility of the IEC).

ISO standards aim to ensure products are safe, of reasonable quality and consistent across different regions and countries. They provide agreed minimum expectations of, or guidance about products; and can help people buying products or accepting donated products to understand important features about that product (for example, the slope on which a wheelchair becomes unstable, or the maximum body weight a device is designed to carry).

As for all international standards, ISO standards are written to be relevant worldwide. This means that they do not include specific requirements for an individual country or region; as this is the responsibility of a local standards or government body. ISO standards also do not define which product is appropriate for an individual person or individual setting.

How an ISO standard is developed

ISO has a number of Technical Committees (TCs) that coordinate standardisation for specific areas of products. Each ISO standard must have the approval of a majority of participating countries. Two TCs that address standards related to devices covered in these Guidelines are:

- TC173 addresses 'Assistive Products for People with Disability'
- TC168 addresses 'Prosthetics and orthotics.'

Standards are regularly updated to improve them as a result of experience. It is therefore important to use and reference the most recently published version of each standard (shown by the year after the standard number).

Who decides if a product meets an ISO standard?

Each standard includes all the details of the equipment and methods (or where to find them) necessary to do the tests provided. The criteria or reports needed are also clearly indicated. Many manufacturers, universities and specialised laboratories are able to test to ISO and other standards. When relying on the results of a test report or certification it is important to know:

- Whether the testing facility has been accredited to carry out the specific tests involved. The accreditation process is usually carried out for testing facilities by an accreditation body in their country. For example, in Australia, the National Association of Testing Authorities (NATA) provides accreditation for Australian testing facilities.
- How independent is the testing facility of the people who produce or sell the product?

Testing facilities that have been accredited, and that are independent of the people who either produce or sell the product can be relied upon to indicate whether products do or do not meet the standard.



Using ISO standards to develop country/region specific standards

To ensure that products are appropriate to the context in which they are used, some regions and many countries use ISO standards to develop more specific requirements that relate specifically to their context. Sometimes countries establish an overall product standard.

As an example, in Europe and in Australia/New Zealand, overall product standards for manual wheelchairs have been developed (In Europe this Standard is EN12183; and in Australia / New Zealand this Standard is AS/NZS3695-1). These standards set overall requirements based on the tests and results from the ISO 7176 series noted above. A device that passes the relevant standard for that type of equipment would be considered to have met all the relevant ISO standards for that device.

Other regulation agency approvals

In many countries assistive technology is considered a medical device and is then regulated by the relevant medical device authority with special requirements. Much of this has been harmonised around the world, and is based on principles that are designed to assure the public of safety and effectiveness of products. Products covered by such regulation agency approvals can be identified as follows:

- Products from Europe may be 'CE marked' or the supplier may self certify that the product complies with the Medical Device Directives.
- Products from Australia may be on the Australian Register of Therapeutic Goods (or ARTG)
- Products from the USA may have 'FDA approval' (for Food & Drug Administration Approval)

All of these systems and regulations depend on manufacturers or suppliers showing evidence of their product safety and usefulness. In most cases this is done using the standards already mentioned.

It is important to note however, that as assistive technology is generally considered low risk technology, most regulation agencies permit 'self-certification'. There have been cases in all jurisdictions of suppliers not having the evidence of their compliance when audited by the regulator. In this instance, registration/marketing is withdrawn and the company fined. Standards testing remains the most consistent and widely recognised way of demonstrating product safety and performance.

Limits of standards

Standards are focused on the needs of a broad population and address overall safety and performance of a product. Standards cannot replace sound clinical assessment and reasoning, combined with trials in partnership with users and feedback and training in the correct use of assistive devices (preferably in the user's normal daily environment). This is essential to achieve safe outcomes that deliver the best performance from the technology.

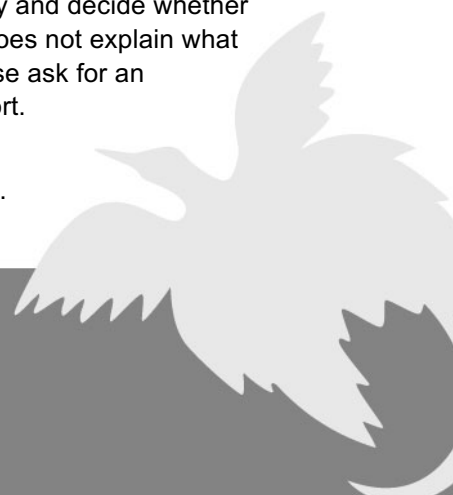
How to find out if a device has been tested and passed ISO standards

ISO standards cover many aspects of both assistive devices and the companies who make and sell them. ISO9000 and ISO14000 are both quality related standards about organisations – they do not provide information about an individual product. Companies that meet these standards are probably better as suppliers than those who do not meet these standards. However, they can still offer devices that may not meet individual ISO standards. Table 4.1 below describes how to find out whether a product meets the appropriate product standard.



Annex 4 Table 1: How to find out whether a product meets the appropriate product standard

| | | |
|----|--|--|
| 1. | Identify the product type | Use the ISO recognised name of AT, to find the relevant ISO standard/s. |
| 2. | Find out what product standards may apply to that product. | Some products have a single relevant ISO standard. Other products have several ISO standards would be relevant (for example wheelchairs). In this case it may be easier to identify a relevant country's overall standard that draws on the ISO standards (for example in Australia the relevant standard for manual wheelchairs is AS/NZS3695.1). Note: Relevant ISO standards for Mobility AT have been provided in these Guidelines to provide an example of how ISO applies to AT. For other AT, seek assistance from NISIT. |
| 3. | Ask the supplier to provide a report or certificate from an accredited independent testing centre of the product to the relevant product standards. | <p>If you are concerned about the quality of a test:</p> <ul style="list-style-type: none"> • Ask the Papua New Guinea Laboratory Accreditation Scheme (PNGLAS) staff at NISIT whether the accreditation would be considered independent. OR • Check the list of accredited independent testing agencies in the Asia Pacific Region at: www.aplac.org/aplac_mra.html |
| 4. | Check the report or certificate. | <p>Make sure that the report or certificate relates specifically to the product you are planning to buy. It should clearly show:</p> <ul style="list-style-type: none"> • The relevant standard/s the product has been assessed/tested for (this should include the name and year of the standard). • The manufacturer's name and detail • A brand/model name and/or number and a photo of the AT tested • The date of the test <p>If any of these don't match the product you are planning to buy you need to ask for an explanation in writing, or for the correct certificate/report.</p> |
| 5. | Check the testing level (which typically relates to the weight of the user) | Check the details of the report/certificate on the test. For example, some standards assume a user weight of 100kg; and others allow the manufacturer to test to any user weight. If purchasing a product for use by people who weigh more than 100kg, it would be unwise to supply products that have only been tested to 100kg. |
| 6. | Read the test results carefully. | <p>Reports / certificates should clearly show whether the product:</p> <ul style="list-style-type: none"> • Complies with/passes/meets the requirements of the relevant standard. For example: this product complies with AS/NZS3695.1 (2011) • Partially complies with/meets in part the requirements • Does not comply with/failed the requirements <p>If a product partially complies with/meets in part the requirements – check what areas the product failed/did not comply and decide whether that matters. Sometimes the report or certificate does not explain what aspect/s of the Standard/s was not met. In this case ask for an explanation in writing or a copy of the full test report.</p> <p>If a product does not comply/failed to meet the requirements it is un-wise to purchase the product.</p> |



Remember:

- Some tests are not pass/fail. Instead they provide information about the characteristics of the device. For example, all wheelchairs pass ISO7176-1 as this standard simply reports the maximum slopes on which the non-moving wheelchair does not tip over. If purchasing wheelchairs for a location where many ramps have slopes of 1:14 (4 degrees or 7% grade) it would not be a good idea to accept wheelchairs that tip over on slopes of 2 degrees. (An exception to this may be when procuring wheelchairs for skilled, active wheelchair users who require a more 'tippy' wheelchair).
- Standards are focused on the needs of a broad population and address overall safety and performance of a product. Sound clinical assessment and reasoning, combined with consumer trials, feedback and training in the correct use of their assistive technology (preferably in their normal daily environment) is essential to achieve safe outcomes that deliver the best performance from the technology.*

Example of standards: mobility AT

The following section outlines the relevant ISO standards for mobility AT as an example of what is covered by each standard and how this might be useful in PNG.

| Widely used standards (non ISO) that relate to mobility AT | |
|--|---|
| EN12182; AS/NZS EN12182 | General requirements for safety of assistive technology |
| EN12183; AS/NZS3695.1; ANSI/RESNA WC1 | Design and Performance Requirements of Manual Wheelchairs |
| EN12184; AS/NZS3695.2; ANSI/RESNA WC1 & WC2 | Design and Performance Requirements of Electrically Powered Wheelchairs |
| ANSI/RESNA WC3 | Wheelchair seating |
| ANSI/RESNA WC4 | Wheelchairs & transport |

Wheelchairs and walking aids

| Relevant ISO standard | What this standard covers | How this standard may be useful in PNG |
|---------------------------|---|---|
| Manual wheelchairs | | |
| 7176-1 | Wheelchair stability, tested by the amount of slope the wheelchair can be on before it may tip over (to the side, front, backwards, with/without anti-tip devices). | Wheelchair stability affects how safe the wheelchair is, and how well the user can carry out activities in the wheelchair. Wheelchair stability is very important for wheelchairs that are likely to be used outdoors in PNG where many people live in rural areas with rough ground and sloping areas. |



| Relevant ISO Standard | What this standard covers | How this standard may be useful in PNG |
|-----------------------|---|--|
| 7176-3 | How well the wheelchair brakes work to: <ul style="list-style-type: none"> Keep the wheelchair still Stop the wheelchair when it is moving. | A pass result means that the brakes work. Keeping the wheelchair still: Brakes that work well are important to keep the wheelchair user safe when getting in and out of the wheelchair, and to keep the wheelchair steady when the user is carrying out tasks (for example cooking, gardening, working at a desk or workbench). Stopping the wheelchair while moving: Brakes that work well to help stop a moving wheelchair are important for wheelchair users self-propelling and/or being pushed up and down slopes. |
| 7176-5 | Wheelchair dimensions, wheelchair weight, turning space | Wheelchair dimensions: A description of the basic dimensions of the wheelchair. Wheelchair weight: The weight of the wheelchair is one factor that affects how easy the wheelchair is to propel or push. Usually, the heavier a wheelchair, the more energy is needed to propel or push it. Heavier wheelchairs are also harder to lift (for example to put into a vehicle). This should also be considered when selecting a wheelchair. Turning space: This is the amount of space needed for the wheelchair user to turn around. The turning space affects how easily a wheelchair can be used in small spaces. |
| 7176-7 | Measurement of seating and wheels. Note: This standard <i>will become an Annex of 7176-5 by 2016.</i> | Seating measurements are important to check the size range is suitable for the PNG population. These measurements are also used to select the correct size of wheelchair for individual users. Rear wheel measurements: tell you the size of tyres and the push rims and their position for the occupant to reach. |
| 7176-8 | How strong the wheelchair is including ability to carry the indicated weight of the user, withstand running into things, and wear and tear over time. | A pass result means the wheelchair is strong enough for typical use by a wheelchair user of the indicated weight. <i>It is very important to note that tests for this standard do not cover use of a wheelchair in adverse environments. A pass result of this test may not mean the wheelchair will last well in PNG, particularly if the wheelchair is used outdoors. There are new standards being developed for these settings.</i> |
| 7176-16 | Flammability of postural supports | Flammability means how easily the postural supports may catch fire. A pass result means any of the materials that contact the user (for example backrest and seat) will not catch fire from a match and keep burning. This is very important in PNG where many people cook with open fires. |
| 7176-19 | Use of wheelchairs as seats in a motor vehicle | A pass result means the wheelchair is strong and safe enough for the user to travel in their wheelchair in a motor vehicle (with the correct tie-down straps fitted to the car to hold the wheelchair in place). |



| Relevant ISO Standard | What this standard covers | How this standard may be useful in PNG |
|--------------------------------------|--|--|
| 7176-26 | Terminology | All of the terms to be used to describe wheelchairs and their parts. |
| Walking frames | | |
| 11199-1 (without wheels) | Requirements and test methods for strength, stability and labelling. | A pass result means that the device has enough strength and stability for normal use and is labelled correctly. <i>Note: These standards do not apply for devices meant for children weighing less than 35kg.</i> |
| 11199-2 (with wheels) | | |
| Elbow crutches | | |
| 11334-1 | Requirements & test methods for strength, usability, basic safety, labelling and resistance to low temperature damage. | A pass result means that the device (when used normally by users up to the indicated user weight) is strong enough to be safely used as an elbow crutch and is labelled correctly. Damage in low temperatures is not particularly relevant in PNG. |
| Under arm crutches and walking canes | | |
| No ISO standard | Note: An international standard is being developed. However the European standard EN1985 (1999) which covers general requirements and test methods is still current. | |
| Walking sticks with 3 or more legs | | |
| 11334-4 | Requirements & test methods for stability, strength, usability, basic safety and labelling. | A pass result means the device (when used normally by adults weighing up to 100kg or children weighing up to 35 kg) is strong enough, has enough stability, can be used safely as a walking stick, and is labelled correctly. |
| Feet (tips) for walking aids | | |
| 24415-1 | Friction | A pass result means that (when new) the tip is less likely to slip on dry, flat surfaces. In PNG, where surfaces may be wet and are often not flat, extra care should be taken when walking with a walking aid even if the tip has passed this standard. |
| 24415-2 | Durability | A pass result means the tip should last for a reasonable length of time. In PNG, even tips that have passed this standard may wear out more quickly than expected due to the types of surfaces users may be walking over. |



Prosthetic and Orthotic devices

There are ISO standards relevant to prosthetic and orthotic devices, some of which are outlined in below. It is important to remember for procurement purposes that devices passing these standards have been tested under normal conditions. This may not take into account durability of components in tropical, coastal and rural environments such as PNG. Further, many prosthetic and orthotic components have been designed specifically for low resource settings. Some of these may not have been through ISO standard testing procedures however may still have a good reputation for durability and strength in tropical climates. It is important when choosing and procuring components and materials to ask suppliers about standard testing that has been performed, as well as any field testing that has been conducted. The prosthetic (Annex 11) and orthotic (Annex 10) procurement guides outline further steps to take to make sure the components and materials procured are of appropriate standard.

| Relevant ISO standard | What this standard covers | How this standard may be useful in PNG |
|----------------------------------|---|--|
| Prosthetics and Orthotics | | |
| ISO 10328:2006 | The methods for static and cyclic strength tests for lower-limb prostheses. | Lower limb prosthetics meeting this standard have been strength tested using approved ISO test methods for use in normal conditions. Note: Test conditions are not the same for PNG users, who may be living in rural environments, and may not always wear a shoe. |
| ISO 22523:2006 | Requirements and test methods for external limb prosthesis and orthoses including: <ul style="list-style-type: none">• Strength,• Materials,• Restrictions on use,• Risk, The standard also describes what information should be supplied with the device. | Individual components of devices and assemblies (a number of components assembled together) that meet this standard have been tested using an approved ISO test method for use in normal conditions. Note: Test conditions are not the same for PNG users, who may be living in rural environments, and may not always wear a shoe. <i>(ISO10328 above accepts the methods in this standard as equivalent)</i> |
| ISO 22675:2006 | Offers different methods to the structural tests on prosthetic ankle-foot devices and feet specified in 17.2 of ISO 10328:2006. Currently under revision and both standards will soon be reviewed. | |



Annex 5: List of data for service providers to collect

Introduction

Collection and storage on a data base of a minimum set of data about clients and the AT service they receive can assist service providers to monitor their effectiveness; provide quality information about the services they provide to Government, donors and development partners; develop a more comprehensive picture of the need for AT as data bases grow; make well informed decisions regarding service delivery.

This Annex provides a list of data that could be collected at three stages of service delivery:

- Registration – at the point that a client first attends the AT service
- Prescription – at the point that assessment has been carried out, and AT prescribed
- Follow up – at the point that the client is followed up

Three sample forms are also provided in this Annex from a wheelchair service. These give an example of how standardised service forms can assist in enabling service personnel to routinely collect the data that is required. These forms can then be used to enter selected data into a data base.

Setting up a service data base

Ideally, a service data base should be set up that has pre-defined, drop down lists for as many of the fields as possible. This helps ensure the consistency of data inputted, which is essential to be able to run reports. Some particular fields may be set up to generate information. For example, the Samoan National Health Service Mobility Device Service data base has pre-defined those villages in Samoa that are classified as 'rural' and those that are 'urban'. Once a client's village name is selected from a drop-down list, the 'rural / urban' field is automatically completed.

In addition, a service data base should be able to run standard reports, to provide key information for service managers, policy makers, donors etc. The reports that are needed will affect the choice of data fields built into the data base.

Finally, it is important to note that a data base is only useful when:

- Good systems are in place to ensure that data is collected in a systematic way at the right time.
- Data is entered correctly into the data base.
- Reports are being run, and the information generated is being analysed and used to inform service delivery, report to donors / Government etc.

Privacy and confidentiality

All client records (paper and digital) need to be stored securely, and the privacy of clients respected. This should be in accordance with relevant PNG Government legislation relating to privacy. Some general guidelines include:

- Clients should be aware that information they provide will be stored on paper and in a data base.
- When providing reports to any external organisation, service providers should remove names and addresses of individual clients unless permission to include names has been given by clients.
- Paper records should be kept in a secure location, with access only by authorised service personnel.
- Data bases should be password protected, not copied onto USB sticks, and accessed only by authorised service personnel.



List of possible data fields on a service provider data base

The following list of data fields represents information that could be collected **and stored in a data base**. Additional information will need to be collected (for example during assessment) as part of the process of service delivery. However not all information needs to be entered into a data base. The suggested data fields below are those that may be of most interest and value in terms of monitoring, evaluating and learning about AT services.

Agreement amongst service providers of general data that is collected would help in building an overall, national picture of AT service delivery needs in PNG.

Information collected (and stored on data base) at registration:

- Name of client
- Client identifying number (for example a national ID, or an identifying number generated and assigned to each client by the service provider)
- Gender
- Age (category – for example 0-5, 6-13, 14-18, 19-39, 40-54, 55+)
- Transport (how the client arrived at the service)
- Address: village, district, region
- Distance from service (close, distant, remote)
- Area type (rural, urban, peri-urban)
- Diagnosis 1
- Diagnosis 2
- Date of registration
- Service provider
- Referral source
- Impact base line data may also be collected

Information collected (and stored on data base) when *each* AT is prescribed for the client:

- Name
- Client identifying number (may be a national ID / identifying number provided by the service provider)
- Specific type of AT
- Size of AT (if relevant)
- Key information about that AT that may assist in future ordering / procurement decisions (see sample wheelchair prescription form as an example).
- Serial number of the device (if available)
- Service provider personnel (responsible for prescription)
- Funder of the device



Information collected (and stored on data base) at *each* follow up visit for the client:

- Name
- Client identifying number (may be a national ID / identifying number provided by the service provider)
- Service provider carrying out follow up
- Service provider personnel responsible for follow up
- Date of follow up
- Major activity carried out at follow up 1 (such as user training, repair, referral for replacement AT)
- Major activity carried out at follow up 2 (such as user training, repair, referral for replacement AT)
- Major activity carried out at follow up 3 (such as user training, repair, referral for replacement AT)
- Is the AT still being used (yes or no)
- Satisfaction with AT (scale of 1-5)
- Impact data may also be collected if a base line was collected at registration



SAMPLE: Wheelchair service provider registration form

| | | | | | | | | | | |
|----------------|--|--|--|--|--|--|--|--|-------|--|
| Client Number: | | | | | | | | | Date: | |
|----------------|--|--|--|--|--|--|--|--|-------|--|

1. Service information

| | |
|-------------------|--|
| Service provider: | Provider A <input type="checkbox"/> Provider B <input type="checkbox"/> Provider C <input type="checkbox"/> Other: _____ |
| Referral source: | Source A <input type="checkbox"/> Source B <input type="checkbox"/> Source C <input type="checkbox"/> Other: _____ |

2. Client information

| | | | |
|---------------------------------|--|---------------|--|
| Title: | | First names: | |
| Preferred name: | | Surname: | |
| Date of Birth: | | Age: | |
| Address: | | | |
| Village: | | Island: | |
| District: | | Phone number: | |
| Additional contact information: | | | |

3. Demographics

| | | | |
|--------------------------------------|---|------|---|
| Gender: | Male <input type="checkbox"/> Female <input type="checkbox"/> | Age: | 0-5 <input type="checkbox"/> 6-18 <input type="checkbox"/> 19-39 <input type="checkbox"/> 40-54 <input type="checkbox"/> 55+ <input type="checkbox"/> |
| Transport used to reach the service: | Private car <input type="checkbox"/> Service transport <input type="checkbox"/> Taxi <input type="checkbox"/> Public bus <input type="checkbox"/> Boat/ferry <input type="checkbox"/> Aircraft <input type="checkbox"/> On foot <input type="checkbox"/> | | |

4. Existing device and diagnosis

| | | | | |
|--|--|--|--|---|
| Does the client have an existing device(s)? | | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |
| If yes, what type of device? | | Wheelchair <input type="checkbox"/> Walking Aid <input type="checkbox"/> Orthosis <input type="checkbox"/> Prosthesis <input type="checkbox"/> | | |
| Was the device provided by the Service? | | Yes <input type="checkbox"/> No <input type="checkbox"/> | | |
| If no, who provided the device? | | Provider A <input type="checkbox"/> Provider B <input type="checkbox"/> Provider C <input type="checkbox"/> Other: _____ | | |
| Did you or your family pay for the device? | | Yes <input type="checkbox"/> If yes, how much? _____ No <input type="checkbox"/> | | |
| What is your diagnosis? (tick all relevant) | Diabetes <input type="checkbox"/> Spinal Cord Injury <input type="checkbox"/> TB Spine <input type="checkbox"/> Stroke <input type="checkbox"/> Brain Injury <input type="checkbox"/> Frail old age <input type="checkbox"/> Arthritis <input type="checkbox"/> Spina Bifida <input type="checkbox"/> Cerebral Palsy <input type="checkbox"/> Complex Fracture <input type="checkbox"/> No Diagnosis <input type="checkbox"/> Other: _____ | | | |
| | Lower limb amputation <input type="checkbox"/> | | Upper limb amputation <input type="checkbox"/> | |
| | Partial foot amputation | L <input type="checkbox"/> R <input type="checkbox"/> | Transhumeral (above elbow) | L <input type="checkbox"/> R <input type="checkbox"/> |
| | Ankle/knee disarticulation (circle) | L <input type="checkbox"/> R <input type="checkbox"/> | Transradial (below elbow) | L <input type="checkbox"/> R <input type="checkbox"/> |
| | Transfemoral (above knee) | L <input type="checkbox"/> R <input type="checkbox"/> | | |
| | Transtibial (below knee) | L <input type="checkbox"/> R <input type="checkbox"/> | | |
| Other information: | | | | |

SAMPLE: Wheelchair Prescription Form - Basic

This prescription (selection) form is for recording the choice of wheelchair, wheelchair components and cushion for a wheelchair user who is able to sit upright comfortably.

| | | | |
|-------------------|--|-------|--|
| Client number: | | Date: | |
| Service provider: | | | |

1. Wheelchair user information

| | | | |
|-------------------------|--|----------------|--|
| Wheelchair user's name: | | | |
| Assessor: | | Technician: | |
| Date of assessment: | | Date provided: | |
| Serial number(s): | | | |
| Funder: | | | |

2. Type of wheelchair and size selected (mark selections clearly)

| Seat Width: mm (inches) | | | | Backrest Height: mm (inches) | | |
|-------------------------|-----------------------|-------------------------|----------|------------------------------|-------------------------|-----------------------|
| WM3 | WM4X | RR | Standard | WM3 | WM4X | RR |
| | | 320 (12.5) ¹ | 305 (12) | Low: 370 (14.5) | Low: 370 (14.5) | Low: 355 (14) |
| S: 360 (14.2) | S: 360 (14.2) | 355 (14) | 355 (14) | | | Med: 406 (16) |
| M: 400 (15.7) | M: 400 (15.7) | 395 (15.5) | 406 (16) | | | |
| L: 440 (17.3) | L: 440 (17.3) | 430 (17) | 457 (18) | | | |
| XL: 480 (18.9) | XL: 480 (18.9) | 470 (18.5) | 508 (20) | High: 460 (18.1) | High: 470 (18.5) | High: 457 (18) |
| | | | 559 (22) | | | |

| Seat Depth: mm (inches) | | | | WM3 | WM3 | ALL |
|-------------------------|------------|-----------------------|----------|----------------|-----------------------|-----------------|
| WM3 | WM4X | RR | Standard | Backrest Angle | Footrest position | Footrest height |
| | 350 (13.8) | 355 (14) | 355 (14) | Forward | Forward ² | L: |
| 400 (15.7) | 400 (15.7) | 406 (16) | 406 (16) | Middle | Backward ² | |
| 440 (17.3) | | 457 (18) ³ | 457 (18) | Back | | R: |
| 480 (18.9) | | | | | | |

| Rear Wheel Balance Position | | | | | |
|-----------------------------|---|------|---|--------|---|
| WM3 | | Safe | | Active | |
| WM4X | | Safe | | Active | |
| RR | 5 | 4 | 3 | 2 | 1 |

| Cushion | |
|-----------------------|---------------------|
| WM3 | Custom Foam Cushion |
| WM4X | Jarik RR cushion |
| Jarik gel: Size _____ | |

| |
|---------------|
| Notes: |
|---------------|

| Attachments | |
|-------------|-------------|
| Trike | Stump board |

3. Agreed

| | | | |
|----------------------------|--|---------------------------|--|
| Signature of the user: | | | |
| Signature of the assessor: | | Signature of the manager: | |

¹ Only available in 355mm(14") seat depth. Possible to extend to 406mm(16") but not to 457mm(18").

² When the WM3 is in the safe rear wheel balance position and the footrest height is between 360 and 420mm, the footrest MUST be placed in the backward position.

³ 457mm (18") seat depth is achieved by adding a 50mm (2") seat extension that comes with all Rough Rider wheelchairs to a 410mm (16") wheelchair.

SAMPLE: Wheelchair Follow Up Form (basic level)

This form is for recording information from a follow up visit.

1. Wheelchair user information

| | | | |
|--|--|--------------------|--|
| Wheelchair user name: | | Number: | |
| Date of fitting: | | Date of follow up: | |
| Name of person carrying out follow up: | | | |
| Follow up carried out at: | Wheelchair user's home <input type="checkbox"/> Wheelchair service centre <input type="checkbox"/> Other: _____ | | |

2. Interview

Record action to be taken:

| | | |
|--|--|--|
| Are you using your wheelchair as much as you would like? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no – why not? | | |
| Do you have any problems using your wheelchair? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes – what are the problems? | | |
| Do you have any questions about using your wheelchair? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes – what questions. Is further training needed? | | |
| Does the wheelchair user have any pressure sores? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes - describe (location and grade) | | |
| How would you rate your satisfaction with your wheelchair from 1 - 5? (1 is very satisfied and 5 is not satisfied) | Rate: | |
| Comment: | | |

3. Wheelchair and cushion check

| | | |
|--|--|--|
| Is the wheelchair in good working order and safe to use? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Is the cushion in good working order and safe to use? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no for either, what is the problem? | | |

4. Fitting check

| | | |
|--|--|--|
| Does the wheelchair fit correctly? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no – what is the problem? | | |
| Pressure test level (1 = safe, 2 = warning, 3 = unsafe) (if user at risk of developing a pressure sore) | Left: | |
| | Right: | |
| Is the wheelchair user sitting upright comfortably when still, moving, and through the day? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no – what is the problem? | | |

Annex 6: Procurement checklist for: **Hearing Aids**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises the things to consider when procuring hearing aids for PNG.

There are many types of hearing AT. This procurement checklist focuses on hearing aids, and gives some general information to assist in procuring them. Hearing aids should only be procured when the appropriate training and support services are in place to properly provide them.

The suggestions below are a general guide; procurement decision should not be made without the advice of local service personnel that specialise in hearing AT. External technical advice from specialists in hearing aid provision in less resourced settings is also advised, to ensure that PNG procurement (and therefore users) can benefit from any recent advancement in technology.

The selection of hearing aid technology is also dependant on the knowledge of the workforce. Personnel must know how to use the equipment that is procured to fabricate ear moulds, or know how to set up and repair the types of hearing aids that are sourced. Procurement should either be of devices that personnel are already familiar with, or should occur in collaboration with training programmes that are organised prior to equipment being delivered.

1. Selecting products

Think about the following factors when making procurement decisions for hearing AT:

- **Size:** Select a range of sizes in the hearing aids to make sure that clients of different ages and sizes can be correctly fitted.
- **Hearing aid style:** Behind the Ear (BTE) or Body Worn (BW) hearing aids have been recommended for use in PNG. Choice should depend on users preference, features of the device, activity level and availability of batteries.
- **Hearing aid range:** Select a range of hearing aids to meet the needs of users with varying levels and types of hearing loss. Specialists in hearing aid provision in less resourced settings should guide the required range.
- **Processing method (digital or analogue):** Digital hearing aids are the preferred option by WHO. The choice as to digital or analogue should be made based on the preference and experience of local specialists, however it is recommended that PNG explore affordable options for digital hearing aids due to the growing benefits of this technology and recognising that analogue hearing aids are becoming less available. A smaller range of digital hearing aids is needed to meet the different needs of users when compared to analogue devices.
- **Durability:** Hearing aids should be able to withstand mild impact shocks, light rain, heat, dust and humidity. Some hearings aids are coated during the manufacturing process to provide resistance against humidity related damage. This treatment is recommended for hearing aids to be procured for PNG [9].
- **Fitting services:** All hearing aids need to be prescribed following an assessment of the users needs. Each prescribed device must be set up and tuned during fitting to best meet the needs of the user. The service also requires an appropriate ear mould fabrication and fitting service.



- **Training:** A hearing aid service must include staff trained in the fabrication and fitting of ear moulds, assembly, repair and maintenance of the hearing aid and programming of the device to best meet the users needs.
- **Technical support:** When selecting software make sure there is reliable and accessible technical support available to users.
- **Spare parts:**
 - **Batteries:** All devices should use batteries that are affordable and locally available. Rechargeable batteries are more cost effective. Rechargers should be available as; solar powered, mains electricity powers, or high voltage battery (i.e. car battery) powered.
 - **Cords:** Replacement cords for BW hearing aids are frequently required and should be available.

2. Summary of features to look for

| | Features to look for |
|-----------------------------|---|
| All hearing aids | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Hearing range options meet different needs of users with hearing impairment (see WHO Preferred Product Profile performance requirements [9] below). <input checked="" type="checkbox"/> Compression <input checked="" type="checkbox"/> Feedback management <input checked="" type="checkbox"/> On-off switch <input checked="" type="checkbox"/> Volume control <input checked="" type="checkbox"/> Tele-coil facility <input checked="" type="checkbox"/> Spare parts readily available <input checked="" type="checkbox"/> Servicing and maintenance support available through supplier <input checked="" type="checkbox"/> Instruction material |
| Behind the Ear (BTE) | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Digital recommended <input checked="" type="checkbox"/> Compatible with free, open source fitting software <input checked="" type="checkbox"/> Variety of sizes for adults and children <input checked="" type="checkbox"/> Climate resistant coating |
| Body Worn (BW) | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Belt clip <input checked="" type="checkbox"/> Replacement cords with pin configuration for selected style. |



| | Features to look for |
|-----------------------|--|
| Ear mould | <p>Custom mould:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Compatible with hearing aid type <input checked="" type="checkbox"/> Sustainable production facilities OR instant mould technology <p>Standard mould:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Compatible with hearing aid type <input checked="" type="checkbox"/> Disposable standard flexible dome ear moulds <input checked="" type="checkbox"/> Available in multiple sizes |
| Hearing aid batteries | <p>Replaceable batteries:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Compatible with hearing aid type <input checked="" type="checkbox"/> Locally available or readily available through supplier <input checked="" type="checkbox"/> Affordable <input checked="" type="checkbox"/> Zinc air type <input checked="" type="checkbox"/> Rust resistant <p>Rechargeable batteries:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Battery charger available and affordable <input checked="" type="checkbox"/> Solar and/or mains battery charging option |
| FM system | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Wireless, hands free microphone <input checked="" type="checkbox"/> Compatible with Tele-coil receivers (preferred) or available with direct audio input receivers that are compatible with available hearing aids. |



3. Hearing aid technical specifications

The WHO Preferred product profile for hearing aid technology suitable for LMICs (2013) outlines the following performance requirements for a hearing aid.

| Hearing aid parameter | Minimum requirement |
|--|--|
| Maximum OSPL (90) | 100 - 130 dB SPL +/- 4 dB |
| OSPL (90) at 1 kHz | 90 - 124 dB SPL +/- 4 dB |
| Maximum full-on acoustic gain | 45- 67 dB SPL +5/-0 dB |
| Full-on acoustic gain at 1 kHz | 42 - 70 dB SPL +5/-0 dB |
| Basic frequency response | 200 Hz to 4500 Hz 200 Hz to 2000 Hz +/- 4 dB SPL 2000 Hz to 4500 Hz +/- 6 dB SPL |
| Total harmonic distortion at 70 dB SPL input | 500 Hz <8% 800 Hz <8% 1500 Hz < 2% |
| Equivalent input noise @ 1 kHz | <30 dB SPL @ 1 kHz |
| Battery current drain | ≤ 1 mA |
| Battery life | provide power for 2 to 3 weeks |
| Tele-coil sensitivity | ≥ 75 dB at 10 mA/m |



Annex 7: Procurement checklist for: **Walking Aids**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises the things to consider when procuring priority walking aids for PNG. Walking aids includes crutches, walking frames and walking sticks.

1. Selecting products

Think about the following factors when making procurement decisions for walking aids. These considerations are also relevant for locally made walking aids (axilla crutches):

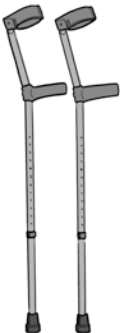
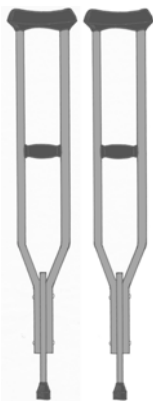

- **Size range:** Select a range of sizes in each walking aid to make sure clients of different ages and heights can be fitted with the walking aids. Suppliers may describe sizes as 'child', 'adult' or 'tall'.
- **Strength:** Forearm crutches, walking frames and wheeled walkers have ISO standards for strength. Ask suppliers to provide evidence that these walking aids have passed the relevant ISO standard. This will provide assurance that the materials used are of good quality.

There is not an ISO strength standard for underarm crutches. For imported underarm crutches, ask the supplier to specify the recommended user weight limit (see next bullet). For locally made crutches, carry out strength testing to be sure the crutches are strong enough.



- **User weight limit:** Check the user weight limit that is specified by the supplier. This is the maximum weight the user can be to use that product safely. The weight limit may be described as 'standard' or 'bariatric'. Bariatric products are for heavier users (usually over 130kgs).
- **Weight of the product:** Lightweight walking aids are easier for people to use. This is particularly important for walking aids that have to be lifted off the ground (under arm crutches, elbow crutches and some walking frames). The weight depends on the materials used to make the walking aid. The lightest material is aluminium. Wooden crutches are usually heavier. However, if correctly designed, wooden underarm crutches can be made that are not too heavy.
- **Contoured handgrips:** Contoured, soft handgrips make the walking aid more comfortable to use and reduce the pressure on palms and wrists. This can reduce the risk of injury to the user.
- **Crutch tips:** Select rubber crutch tips that meet ISO standards 24415-1 and 24415-2. These will last longer and are less likely to slip than tips made from other materials.
- **Castor wheels for wheeled walkers:**
 - Where possible select solid rubber castor wheels. These will last longer than other wheels.
 - Select larger wheels (for example 8" in diameter) when the walker is to be used on rough or uneven ground.
- **Transport and storage:** Walking frames are bulky. Consider selecting walking frames that fold for transport and storage. This will make them easier for people to use.
- **Spare parts:** When procuring walking aids, also procure a quantity of the most commonly needed spare parts. These include:
 - Rubber tips (select the correct size tips for the walking aids being procured). Each device will need its tips replaced 3-4 times per year,
 - Arm pads for under arm crutches,
 - Nuts and bolts used for height adjustment
 - Castors for wheeled walking frames.



2. Summary of features to look for

| | Features to look for |
|--|--|
| Forearm crutches  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lightweight (quality aluminium) <input checked="" type="checkbox"/> Double adjustment: handle to ground, & forearm cuff to handle <input checked="" type="checkbox"/> Nylon or rubber hand grips <input checked="" type="checkbox"/> Non-slip rubber tips (ISO 24415-1) <input checked="" type="checkbox"/> Durable rubber tips (ISO 24415-2) <input checked="" type="checkbox"/> Rubber tips can be replaced when necessary <input checked="" type="checkbox"/> Passed ISO 11334-1 (strength, usability, labelling etc.) |
| Underarm crutches  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lightweight (quality aluminium or well designed wooden crutch) <input checked="" type="checkbox"/> Durable rubber underarm pads and hand grips <input checked="" type="checkbox"/> Push pin height adjustment <input checked="" type="checkbox"/> Non-slip rubber tips (ISO 24415-1) <input checked="" type="checkbox"/> Durable rubber tips (ISO 24415-2) <input checked="" type="checkbox"/> Rubber tips can be replaced when necessary <input checked="" type="checkbox"/> Adjustable height hand grips and shaft <input checked="" type="checkbox"/> Weight limit specified by supplier (or for locally made crutches, strength testing has been carried out) |
| Walking frame  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lightweight (quality aluminium) <input checked="" type="checkbox"/> Rubber hand grips <input checked="" type="checkbox"/> Height adjustable <input checked="" type="checkbox"/> Non-slip rubber tips (ISO 24415-1) <input checked="" type="checkbox"/> Durable rubber tips (ISO 24415-2) <input checked="" type="checkbox"/> Passed ISO 11199-1 (strength, stability, labelling etc. for adult sizes) |



| | Features to look for |
|---|--|
| <p>Walking stick</p>  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lightweight (quality aluminium or wooden) <input checked="" type="checkbox"/> Height adjustable (push pins for aluminium; or finished at the correct height for the user if wooden) <input checked="" type="checkbox"/> Non-slip rubber tips (ISO 24415-1) <input checked="" type="checkbox"/> Durable rubber tips (ISO 24415-2) |
| <p>Wheeled walker</p>  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lightweight (quality aluminium frame) <input checked="" type="checkbox"/> Loop brakes <input checked="" type="checkbox"/> Height adjustable handles <input checked="" type="checkbox"/> Puncture proof/solid rubber castor wheels <input checked="" type="checkbox"/> Passed ISO 11199-2 (strength, stability, labelling etc. for adult sizes) |



Annex 8: Procurement checklist for: **Wheelchairs and cushions**

Procurement of AT includes: identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist will help identify factors to think about when procuring wheelchairs and cushions for PNG.

1. Selecting manual wheelchairs

No single model or size of wheelchair can meet the needs of all users. The diversity of users creates a need for different types of wheelchairs [7]. This means that PNG wheelchair services need to have access to a small range of different wheelchairs, available in different sizes.

There are some wheelchairs already commonly used in PNG that may continue to be successfully used. However as new designs are developed, PNG wheelchair services may like to introduce other options. The following factors can help in making procurement decisions for those wheelchairs already known to PNG services and users, and wheelchairs that may become available in the future.

- **Trialling new wheelchairs:** When introducing a new wheelchair not previously used in PNG, or when purchasing from a different supplier, consider ordering a small quantity to trial. These wheelchairs may be reviewed by PNG wheelchair service personnel and if considered safe for use, trialled with wheelchair users. If the review and trials are positive, a larger order can be placed.
- **Size range:**
 - The size of wheelchairs and cushions are usually described by the seat width. For some seat widths there may be more than one seat depth option. Wheelchair suppliers will describe their wheelchairs in either millimetres (mm) or inches (").
 - It is important to procure a range of seat widths of each type of wheelchair and cushion to meet the needs of clients of different sizes. The table below gives a summary of common wheelchair sizes (seat width).

| Very small | Small | | Medium | | Large | | Extra large | | Bariatric | |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|
| Less than 300mm | 305mm (12") | 355mm (14") | 380mm (15") | 406mm (16") | 432mm (17") | 457mm (18") | 483mm (19") | 508mm (20") | 559mm (22") | Larger than 560mm |

- The most commonly needed sizes for adults are likely to be in the middle of the range between 380mm (15") and 457mm (18"), shown in green above, with fewer of the sizes smaller or sizes larger than that required.
- The most commonly needed sizes for children and youths are likely to be towards the small end, shown in yellow above.
- Extra large and bariatric sizes, shown in red above, cater for larger people who are often heavier as well. People who need bariatric sizes are usually extremely over weight.
- The seat depth is also an important measurement. Common seat depths for adult wheelchairs are: 355mm (14"), 406mm (16"), 457mm (18"). Look for wheelchairs that allow some adjustment of the seat depth.
- Most children who need a wheelchair also need extra postural support to sit upright. Most models of children's wheelchair with postural supports



have adjustable seat width and seat depth so that the wheelchair can be adjusted to fit the child.

- **Frame design and materials:** The design of a wheelchair frame and the material that it is made from has a large effect on the cost, durability and weight of the wheelchair:
 - Wheelchairs with rigid frames (not folding) are likely to last longer than those with folding frames, because moving parts often wear out or break. Most rigid frame wheelchairs have a folding backrest and removable wheels for transportation.
 - Folding wheelchairs with two 'X' cross-folding frames are generally going to last longer than those with only one. This is particularly important for bariatric size wheelchairs as users could weigh 100kg – 130kg.
 - Steel frames are the most common in countries with less resources. Making repairs to these wheelchairs locally is easier than repairing a frame made of aluminium. It is important to check that the coating, paint or plated finish on the steel is of a high enough quality to stop the steel from rusting in PNG. Generally, the cheaper the wheelchair – the poorer the paint finish used.
 - Lightweight wheelchairs in richer countries are usually made from aluminium or titanium and are much more expensive. Consider that it might not be possible to repair an aluminium or titanium frame by welding in PNG.
- **Wheel base length:**
 - The wheel base is the length of the wheelchair measured from where the rear wheel touches the ground to where the front castor wheel touches the ground.
 - Long wheel base wheelchairs are easier and safer to push on rough or uneven ground. Depending on the design, long wheel base wheelchairs may need more space to turn.
 - Short wheel base wheelchairs are harder and less safe to push on rough or uneven ground. Short wheel base wheelchairs are particularly unsafe when travelling down hill on rough or uneven ground (easy to tip the user over forwards). Short wheel base wheelchairs are easier to turn and use in small indoor spaces. Skilled wheelchair users can use short wheel based wheelchairs successfully outdoors by lifting the front wheels (back wheel balancing).
- **Castor wheels:**
 - Solid rubber castor wheels (made with quality rubber) are more durable (will last longer) than other wheels. For rural use, avoid castor wheels that are pneumatic (need to be pumped up with air) or plastic. These types of castor wheels are likely to break down quickly and the wheelchair can then not be used.
 - Select larger wheels (for example 8" in diameter) where the wheelchair is likely to be used where there is rough or uneven ground.
- **Rear wheels:** Manual wheelchairs most commonly use either 24" or 26" rear wheels. Some children's wheelchairs use 20" wheels. For a wheelchair user to push themselves, rear wheels must have push rings attached. Some things to consider when procuring wheelchairs are:
 - Rear wheels with metal spokes can be more easily repaired than those with plastic spokes.
 - Solid tyres can not be punctured. However solid tyres can still break apart if they become damaged and they are very hard to ride on. Look for rubber solid tyres, and avoid polyurethane or PVC tyres wherever possible.
 - Many wheelchair users prefer using tyres with air (pneumatic) because they absorb the shock of impact better. Consider purchasing rear wheels with heavy duty, extra thick or thorn resistant pneumatic tyres and inner tubes to reduce punctures as much as possible. Solid inner tubes inside standard tyres are also worth considering.
 - Rear wheels should have a minimum of two positions, in order to adjust the balance of the user and the wheelchair. Wheelchair users tend to be less mobile in wheelchairs with only one balance position, particularly on rough or uneven ground.
- **Fabric seats and backrests:** Most wheelchairs have a fabric seat and back rest. If the fabric used is poor quality or the wrong type of fabric, it can stretch



and tear. Stretching of the fabric changes the shape of the seat and backrest. This can cause wheelchair users to sit differently, creating postural problems for them. A torn seat or backrest makes the wheelchair unsafe to use.

- Look for wheelchairs that allow for the seat and backrest to be tightened OR that use a fabric that does not stretch. Seat upholstery which is reinforced by webbing or 'car seat belt' type material will last longer and stretch less.
- Look for wheelchairs that use fabric that is strong and durable. The weight, grade or thread count of the upholstery fabric is important; the higher the grade, generally the more durable the material will be. Suggest 600D Nylon as a minimum. Some durable wheelchairs have 1200D upholstery fabric.
- **Spare parts:** When procuring wheelchairs, also procure a quantity of the most commonly needed spare parts for making repairs. These include cushions, tyres, inner tubes, nuts and bolts, castor wheels, brakes, bearings, seat and backrest upholstery, and footrests. The moving parts and any removable parts of wheelchairs generally break or get lost first, as well as the wear and tear on the parts in direct contact with the user's body.
- **Durability:** How long a wheelchair will last depends on three main factors:
 - The design of the wheelchair (and suitability of the design to the environment)
 - How often and how well the wheelchair is maintained
 - How much the wheelchair is used
- A good quality wheelchair can last 2 - 5 years if regularly maintained, even if it is used every day. When procuring wheelchairs, consider:
 - Orthopaedic (push type) wheelchairs are not suitable for outdoor use and will break down quickly if used regularly outdoors (less than six months).
 - Testing has shown that Orthopaedic (push type) wheelchairs cost approximately 3.5 times more over their lifecycle than a good quality active wheelchair used in the same conditions [10].

For more details on the functional performance characteristics of wheelchairs please read the WHO Guidelines on the Provision of Manual Wheelchairs in Less Resourced Settings [7].

2. Selecting cushions

Wheelchair cushions are an essential part of any wheelchair. Cushions provide comfort, postural support and pressure relief. Every wheelchair user should have at least one cushion prescribed with their wheelchair. The type of cushion depends on the user's physical needs. Wheelchair users at risk of developing a pressure sore should use a pressure relief cushion. A poor (or no) pressure-relief cushion is the one component of a wheelchair most likely to cause pressure sores, serious injury or premature death [7].

Some wheelchair suppliers provide a cushion with each wheelchair. Always check with the supplier whether a cushion is provided.

- If YES, find out what type of cushion.
- If NO, it will be necessary to procure a stock of cushions for those wheelchairs.

Below are some of the things to consider when procuring a stock of wheelchair cushions for supply with a chosen range of wheelchairs:

- The cushion should be removable from the wheelchair. Which side of the cushion is up and which end should be facing the front of the wheelchair should be clearly indicated.
- **Pressure relief:** Not every user requires a pressure relief cushion. Ensure there are enough pressure relief cushions available in stock so that any person identified as being at risk of developing a pressure sore (see WHO Wheelchair Service Training Package Basic Module) can have one, and that this can be





replaced as required. Some users (not at risk of developing a pressure sore) may use a cushion designed for comfort that does not provide pressure relief.


- **Sizes:** The cushions should match (or be able to made to fit) to size of the wheelchair seat.
- **Materials:**
 - Cushions that contain air, water or gel, can get damaged and deflate. Once flat these cushions provide no pressure relief and could put the user at risk of a pressure sore. Avoid these types of cushions for users remote from services, or at risk of developing a pressure sore.
 - Cushions made of an appropriate foam are low cost, practical and cannot deflate. Contoured foam cushions of an effective design can provide good pressure relief.
- **Cushion covers:** Should be durable, water resistant, fit the cushion correctly and be removable for washing. Avoid covers made from stiff fabrics such as vinyl. These can be hot to sit on and do not match the contours of the cushion. This can increase the risk of developing a pressure sore.
- **Match cushions to the wheelchair:** The cushion used needs to be appropriate for use with the chosen wheelchair. Not all cushions work with all wheelchairs. For example, some cushions are designed to be used on a solid seat, and will not sit well on a wheelchair with a slung (fabric) seat.
- **Quantity of cushions:** Cushions are a consumable item and need to be replaced more regularly than the wheelchair. Cushions may last between six and twelve months. Ideally procure three cushions to one wheelchair so that it is possible to replace cushions as needed.





3. Summary of features to look for (wheelchairs and cushions)

| Wheelchair type | Features to look for |
|--|---|
| All wheelchairs | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Seat: Durable non-stretch fabric and tension adjustable OR for wheelchairs with a solid seat (e.g. marine grade ply) <input checked="" type="checkbox"/> Backrest: Durable non-stretch fabric and tension adjustable <input checked="" type="checkbox"/> Footrest: Height adjustment <input checked="" type="checkbox"/> Frame: Steel frame for ease of repair and high quality paint finish. <input checked="" type="checkbox"/> Rear wheels: Solid inner tube OR pneumatic inner tubes of good quality; hard wearing tyres; metal spokes (not plastic). <input checked="" type="checkbox"/> Cushions: Should be provided with a cushion (check type and quality of cushion as additional cushions may need to be ordered) <input checked="" type="checkbox"/> Folding possible for transport (e.g. cross folding; OR back folds down, rear wheels come off) <input checked="" type="checkbox"/> Assembly, repair and maintenance instructions provided by supplier <input checked="" type="checkbox"/> Passed ISO 7176-8 (with 100kg load) for adult wheelchairs OR Supplier can provide strong evidence of the wheelchairs strength, durability and suitability. <input checked="" type="checkbox"/> Common spare parts can be procured to have in stock including: tyres, inner tubes, nuts and bolts, castor wheels, brakes, bearings, seat and backrest upholstery, and footrests. |
| Long wheel base rough terrain wheelchair <div style="display: flex; align-items: center;">   </div> | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Long wheel base* (longer than 480mm) <input checked="" type="checkbox"/> Range of seat widths and seat depths <input checked="" type="checkbox"/> Arm rest may follow line of the rear wheels <input checked="" type="checkbox"/> Arm rest may, or may not be removable <input checked="" type="checkbox"/> Durable, non pneumatic, large rubber castor wheels <input checked="" type="checkbox"/> 24" or 26" rear wheels with spokes, minimum 3° camber <input checked="" type="checkbox"/> At least 2 rear wheel axle positions |


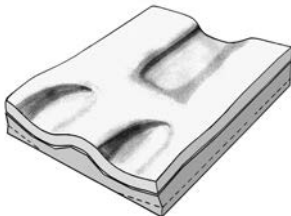


| Wheelchair type | Features to look for |
|---|--|
| Short wheel base active wheelchair  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Short wheel base* (shorter than 480mm) <input checked="" type="checkbox"/> Range of seat widths and seat depths <input checked="" type="checkbox"/> Height adjustable backrest <input checked="" type="checkbox"/> Arm rest may follow the line of the rear wheels; may / may not be removable <input checked="" type="checkbox"/> Durable, non pneumatic, medium size rubber castor wheels <input checked="" type="checkbox"/> 24" or 26" rear wheels with spokes, minimum 3° camber |

* Wheel base is measured from the point where the castor wheel touches the ground, horizontally to the point where the rear wheel touches the ground (vertically down from the centre of the wheel).

| | |
|---|---|
| Orthopaedic (push type) wheelchair  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Range of seat widths <input checked="" type="checkbox"/> Removable and/or swing away armrests <input checked="" type="checkbox"/> Removable and/or swing away footrests <input checked="" type="checkbox"/> Minimum 24" rear wheels with metal spokes <input checked="" type="checkbox"/> Durable, non pneumatic, castor wheels |
| Children's wheelchair  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Range of seat widths and seat depths <input checked="" type="checkbox"/> Adjustable height push handles <input checked="" type="checkbox"/> 20" rear wheels with metal spokes <input checked="" type="checkbox"/> Passed ISO 7176-8 <input checked="" type="checkbox"/> Durable, non pneumatic, castor wheels |



| Wheelchair type | Features to look for |
|---|---|
| Children's wheelchair with postural supports  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> A range of seat widths and depths, or adjustable into a range of seat widths and seat depths to suit children <input checked="" type="checkbox"/> Left and right footrest can be height adjusted individually <input checked="" type="checkbox"/> Height adjustable back rest <input checked="" type="checkbox"/> Postural support devices (PSDs) attached or can be attached; that are adjustable and/or can be modified including: cushion, pelvis side pads, trunk side pads, head supports, pelvis strap, shoulder harness, foot straps. <input checked="" type="checkbox"/> Passed ISO 7176-8 |
| Flat foam cushion | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Single or double layer of foam with no shaping of the top surface. <input checked="" type="checkbox"/> Does not 'bottom out' (when sitting on the cushion, user's seat bones should not make contact with the seat surface) <input checked="" type="checkbox"/> Cover: removable, semi-waterproof, some stretch |
| Pressure relief cushion  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Shaped to provide pressure relief for the seat bones <input checked="" type="checkbox"/> Additional shaping under thighs also is useful <input checked="" type="checkbox"/> Supplier able to give evidence of the pressure relief properties <input checked="" type="checkbox"/> Supplier information about use and how long the cushion should last <input checked="" type="checkbox"/> Fits available wheelchair seat dimensions OR can be adjusted <input checked="" type="checkbox"/> Suitable for available wheelchair seats (hard seat or fabric seat) <input checked="" type="checkbox"/> Foam (either layered foam or moulded) <input checked="" type="checkbox"/> Cover: removable, semi-waterproof, some stretch |



Annex 9: Procurement checklist for: Materials needed to make modifications and additional postural support devices for wheelchairs

Procurement of AT includes: identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist will help identify factors to think about when procuring materials most commonly needed to make cushions, modifications and additional postural supports.

1. Selecting materials

Materials used to make wheelchair modifications or additional postural support devices (PSDs) include:

- Foam
- Webbing
- Velcro
- Upholstery fabric
- Plywood

For most materials there are different specifications and price. When procuring, look for materials that will do the job required well. The cheapest materials may not be good enough quality, however you do not always need to buy the most expensive materials.

Some more detailed information about foam is given below. Use the checklist provided in the section 2 of this annex to guide procurement of foam and other materials.

Information about foam: Foam is used over all PSDs that are in direct contact with the wheelchair user's body. Firm foam, which holds its shape, is used to give PSDs the shape needed to provide the right support. Softer foam is used to add comfort and reduce pressure. There are different types of foam. Procuring the right foam is very important. Types of foam include:

- **Polyurethane (PU) foam:** The most commonly available foam is Polyurethane (PU) foam. PU is good for making cushions, modifications and additional postural supports. PU foam is open-cell which means it will soak up liquids that it comes in contact with. A semi-waterproof cover over PU foam is therefore important. PU foam comes in different thickness, firmness, density and colour.
 - **Thickness:** Stock PU foam that is 25mm, 35mm and 50mm thick.
 - **Firmness:** The amount of support foam provides will depend on how firm it is. Firmness is not the same as density (see below). The firmer the foam the harder it is to compress. Foam firmness can be measured by recording the amount of force needed to compress the foam. See Section 3 of this annex for details of a simple device to measure foam firmness.
 - **Density:** Density is a measurement of the mass per unit volume. It is expressed in kilograms per cubic meter (kg/m³). The higher the density of foam, the more support it provides (depending also on the firmness) and the more it will retain its original shape.




- **Ethylene-vinyl acetate (EVA):** EVA is a firm foam. It is often available in places that manufacturer clothes, shoes or backpacks. Some wheelchair parts are sometimes made from EVA, and EVA is used in the fabrication of prosthetic and orthotic devices. EVA is useful for providing firm support and structure for wheelchair PSDs. EVA is closed-cell which means that it will not soak up liquids that it comes in contact with. EVA is available in sheets of various thickness (3mm, 6mm, 10mm, 15mm, etc). and density (range from 100 kg/m³ to 400 kg/m³).
- **Soft foam:** The most commonly available, 'very soft' foam is not suitable on its own for making cushions or PSDs. This type of foam can be used over a firmer foam, to provide a 'comfort' layer.
- **Firmness and density guide for procuring foam:**

| Name of foam | Used for | Density | Test (kg) |
|-----------------------|--|--|----------------|
| Medium PU foam | Comfort layer: top cushion layer or surface layer of a PSD | 49 kg/m ³ to 53 kg/m ³ | 2.2 to 3.5kg** |
| Firm PU foam | Supportive layer: Bases of cushions, creating cushion contours and wedges (under a comfort layer), etc. | 35 kg/m ³ to 37 kg/m ³ | 3.5 to 5.8kg |
| EVA | Various: For example tray or footplate surface, cushion wedges (under comfort layer), etc. | 100 kg/m ³ to 400 kg/m ³ | 4.5 to 9.0kg |




* 'Chip', 'composite', 're-bonded' or 'bonded' foam can also be used. However this type of foam can vary in firmness as it is an industry waste product.

** This acceptable range of kg includes a variation in test results of ± 0.3 kg.

2. Summary of features to look for

| Material | Features to look for |
|--|--|
| Foam & EVA  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Understand the firmness and the density of the foam and EVA <input checked="" type="checkbox"/> Firm PU foam (see firmness and density guide above) <input checked="" type="checkbox"/> Medium PU foam (see firmness and density guide above) <input checked="" type="checkbox"/> Useful thicknesses of PU foam: 25mm, 35mm and 50mm <input checked="" type="checkbox"/> Useful thicknesses of EVA: 6mm, 10mm, 15mm <input checked="" type="checkbox"/> Very soft foam is not appropriate |

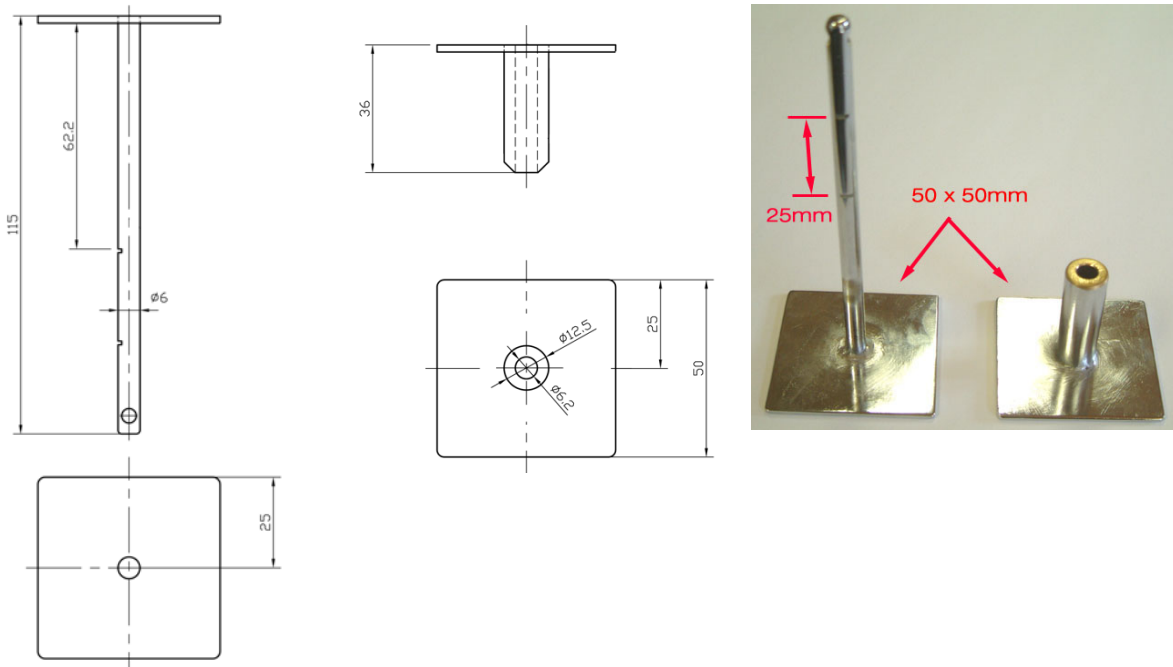


| Material | Features to look for |
|---|--|
| Webbing, Velcro and buckles to make straps  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Nylon webbing rather than cotton webbing <input checked="" type="checkbox"/> Useful widths of nylon webbing: 25mm, 35mm and 50mm <input checked="" type="checkbox"/> Good quality plastic clip buckles last longer <input checked="" type="checkbox"/> Clip buckles should clip together, but not pull apart unless released <input checked="" type="checkbox"/> Purchase clip buckles and velcro in the same sizes as webbing |
| Upholstery fabric  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Water resistant fabric for seats, backrests and cushion covers <input checked="" type="checkbox"/> Fabric for seats: Nylon 500D to 1,000D is more durable <input checked="" type="checkbox"/> Fabric for PSDs: breathable, soft feel, stretch if possible, smooth, natural fibers (such as cotton) |
| Plywood  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Marine grade plywood is more expensive but will last much longer <input checked="" type="checkbox"/> All plywood needs to be finished with a suitable varnish or paint <input checked="" type="checkbox"/> Useful thickness for seats, trays and footrests: 12mm marine <input checked="" type="checkbox"/> Look for a higher number of thin layers (plys) within the 12mm <input checked="" type="checkbox"/> Avoid plywood with 'voids' or 'gaps' in the layers (plys) |



3. Foam testing device

The foam testing device shown below* is for measuring the firmness of PU foam (the density can usually be quoted by the supplier). It consists of two simple metal parts and a weighing scale:



The testing procedure is as follows:



1. Cut a 50 x 50 x 50mm foam sample as accurately as possible (samples cut from moulded parts should not include any external skin) and punch a clearance hole in centre. (right).
2. Fix the scale or spring balance to something solid.
3. Place sample in tester and hang from any spring balance or scale (left).
4. Check that scale reads zero.
5. Apply downwards force evenly on plate on top of foam sample, compressing sample to 50% (note 25mm marks on tester).
6. Record weight in kg.
7. Take several measurements and average the results. To minimise error one person should take all measurements.



Foam sample ready for testing

*Originally devised by Jamie Noon.



Annex 10: Procurement checklist for: **Orthotic components**

Procurement of AT includes: identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist will help identify factors to think about when procuring lower limb orthotic components for PNG.

1. Selecting products

A trained orthotist should always be involved in procurement of orthotic components and materials. Wherever possible, this orthotist should have good knowledge of the different orthotic technologies available for contexts such as PNG. The following will help when making procurement decisions.

- **Size range:** Some components such as orthotic knee and ankle joints come in a range of sizes. Select a range of sizes to allow the correct fit for clients of different ages and sizes.
- **User weight limit:** For each component, check the user weight limit (weight rating) that is specified by the supplier. This is the maximum weight the user can be to use that product safely.
- **Materials:** Select materials that are durable and easy to maintain and repair. It is also important to select materials that are compatible with the components you select and the equipment available to make and adjust devices with.
- **Components:** Where possible ask suppliers what testing has been done of the components and if they have passed relevant ISO tests. Select components that are compatible with available materials and the tools and equipment available to make and repair devices.
- **Tools and equipment available:** All components listed below are used to make orthotic devices. In order to do this, workshop space, equipment and tools are required. Different tools may be required depending on the types of components and materials to be used. The availability of tools and equipment needs to be considered when procuring orthotic components and materials.
- **Trial new components or materials:** When introducing a new component or material that has not previously been used in PNG, or purchasing from a different supplier, consider ordering a small quantity to trial. These components or materials may be reviewed by PNG prosthetist-orthotists and if considered safe for use, trialled with orthotic users. If the review and trials are positive, a higher volume order can be placed.
- **Cost:** The cost of orthotic components varies greatly, depending on the materials and features of different components. Cost therefore needs to be carefully considered, while at the same time considering the function, durability and cosmetic features of each component.
- **Spare parts:** When procuring orthotic components, also procure a quantity of the most commonly needed spare parts. The spare parts needed will depend on the orthotic components used. Suppliers should be able to assist by identifying what spare parts are most likely to be needed.



2. Summary of features to look for

| | Features to look for |
|--|--|
| For all orthotic joints | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Passed ISO testing (ISO 22523:2006 or ISO 22675:2006) and/or <input checked="" type="checkbox"/> Passed field test by a reputable organisation for example the International Society for Prosthetics and Orthotics (ISPO) <input checked="" type="checkbox"/> Relationship between affordability, durability and function <input checked="" type="checkbox"/> Ease of attaching to the orthoses and adjusting the alignment |
| Orthotic ankle joints (free motion and dorsiflexion joints) | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Suitable for use with polypropylene (plastic) AFO/KAFO <input checked="" type="checkbox"/> Bend freely and smoothly <input checked="" type="checkbox"/> Light weight <input checked="" type="checkbox"/> Durable |
| Orthotic knee joints (free knee joint, drop lock knee joint, posterior offset knee joint) | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Suitable for use with polypropylene (plastic) KAFO <input checked="" type="checkbox"/> Included with compatible metal corrosion resistant uprights that are easy to adjust <input checked="" type="checkbox"/> Bend freely and smoothly <input checked="" type="checkbox"/> Light weight <input checked="" type="checkbox"/> Durable <input checked="" type="checkbox"/> Smooth finish on the outside (doesn't tear clothing) <p>Drop lock knee joint</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lock mechanism functions smoothly |



Annex 11: Procurement checklist for: **Prosthetic components**

Procurement of AT includes: identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist will help identify factors to think about when procuring lower limb prosthetic components for PNG.

1. Selecting products

A trained prosthetist should always be involved in procurement of prosthetic components and materials. Wherever possible, this prosthetist should have good knowledge of the different prosthetic technologies available for contexts such as PNG. The following will help when making procurement decisions.

- **Size range:** Some components such as prosthetic feet and stump socks, come in a range of sizes. Select a range of sizes to allow the correct fit for fit clients of different ages and sizes.
- **User weight limit:** For each component, check the user weight limit (weight rating) that is specified by the supplier. This is the maximum weight the user can be to use that product safely.
- **Materials:** Select materials that are durable and easy to maintain and repair. It is also important to select materials that are compatible with the components you select and the equipment available to make and adjust devices with.
- **Components:** Where possible ask suppliers what testing has been done of the components and if they have passed relevant ISO tests. Select components that are compatible with available materials and the tools and equipment available to make and repair devices.
- **Tools and equipment available:** All components listed below are used to make prosthetic devices. In order to do this, workshop space, equipment and tools are required. Different tools may be needed depending on the types of components and materials to be used. The availability of tools and equipment needs to be considered when procuring prosthetic components and materials.
- **Trial new components or materials:** When introducing a new component that has not previously been tried in PNG, or when purchasing from a different supplier, consider ordering a small quantity to trial. These components may be reviewed by PNG prosthetist-orthotists and if considered safe for use, trialled with prosthetic users. If the review and trials are positive, a higher volume order can be placed.
- **Cost:** The cost of prosthetic components varies greatly, depending on the materials and features of different components. Cost therefore needs to be carefully considered, while at the same time considering the function, durability and cosmetic features of each component.
- **Spare parts:** When procuring prosthetic components, also procure a quantity of the most commonly needed spare parts. The spare parts needed will depend on the prosthetic components used. Suppliers should be able to assist by identifying what spare parts are most likely to be needed.



2. Summary of features to look for

| Component | Features to look for |
|-------------------------------|---|
| For all prosthetic components | <ul style="list-style-type: none">✓ Passed ISO testing (ISO 22523:2006 or ISO 22675:2006) and/or✓ Passed field test by a reputable organisation (for example the International Society for Prosthetics and Orthotics, ISPO)✓ Relationship between affordability, durability and function |
| Prosthetic feet | <p>For all feet:</p> <ul style="list-style-type: none">✓ Compatible with the shank components being procured✓ Durability (how long will the foot last with and/or without shoes)✓ Colour of foot (close to skin colour)✓ Split toe (separate big toe) will look more cosmetic (natural)✓ The heel height matches the shoes to be worn✓ Choose feet that suit the activity level (eg. K level) of the users <p>Solid Ankle Cushioned Heel (SACH) feet:</p> <ul style="list-style-type: none">✓ The cushioned heel should compress to reduce shock and provide smooth function (smooth roll over for the foot) <p>Rubber feet:</p> <ul style="list-style-type: none">✓ Weight as low as possible (while ensuring durability and function) <p>Single axis feet:</p> <ul style="list-style-type: none">✓ Availability of spare parts for repair and maintenance✓ Includes all ankle parts needed for the foot to work✓ Ankle joint bumpers that suit the user's activity level and weight for smooth foot function |



| Component | Features to look for |
|--|---|
| Endoskeletal prosthetic shank components (including socket connectors, shank and foot connectors) | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Includes socket connectors, shank and foot connectors; and all bolts and screws needed for assembly <input checked="" type="checkbox"/> Corrosion resistant for humid environments <input checked="" type="checkbox"/> Possible for height and angle adjustments to suit the user <input checked="" type="checkbox"/> Compatible with materials, feet and knees available or being procured <input checked="" type="checkbox"/> Spare parts such as nuts and bolts can be ordered or are available locally |
| Prosthetic knee joints | <p>For all knee joints:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Includes all bolts and screws needed for assembly <input checked="" type="checkbox"/> Corrosion resistant for humid environments <input checked="" type="checkbox"/> Compatible with shank, socket adaptors and materials available or being procured <input checked="" type="checkbox"/> Can be maintained and repaired locally, with spare parts readily available or can be ordered <input checked="" type="checkbox"/> Proven stability <input checked="" type="checkbox"/> No excessive noise when user is walking <input checked="" type="checkbox"/> User should be able to control the knee without excessive effort <p>Single axis knee joint with adjustable stability and/or swing control:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> A manual knee lock may be included in the joint when additional stability is required, for example walking up or down hills <input checked="" type="checkbox"/> Stability and swing control adjustments can be made locally with available tools, materials and expertise <p>Polycentric knee:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Stability and swing control adjustments can be made locally with available tools, materials and expertise |
| Stump socks | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Socks without seams <input checked="" type="checkbox"/> Made of natural fibres such as cotton |



Annex 12: Procurement checklist for: **Braille Assistive Technology**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises the things to consider when procuring braille AT for PNG. Braille AT includes devices that help users to read and produce documents in braille.

There are many different types of braille AT. This procurement checklist provides some general information about procuring some of the more commonly used braille reading and writing equipment. Due to the complexity and costs involved with some braille devices it is important to consult personnel with specialist experience in braille technology when making any procurement decisions. The suggestions below should be used as a general starting point only.

Procurement of braille AT should not happen in the absence of personnel to train and support users. In addition, some devices may be better procured as a community resource (e.g. braille embosser).

1. Selecting products

The following factors are some of the things to think about when making procurement decisions for braille AT:

- **Power source:** Hand held devices that need power should ideally use batteries that are locally available. If rechargeable batteries are used, be aware some users may have limited access to mains power. In this situation, solar recharges may need to be sourced.
- **Cost:** The cost of some devices for producing and electronically reading braille are expensive. Therefore procurement of such items (for example a braille embosser) may be as a community or school resource rather than for individual use.
- **Training:** Make sure personnel with experience in reading and writing Braille are available for the training of users.
- **Technical support:** Make sure there is reliable and accessible technical support to assist with software and mechanical repair of devices.
- **Spare parts:** When procuring braille AT, also procure a quantity of the most commonly needed spare parts such as:
 - **Batteries:** Any required batteries should be available locally. Rechargeable batteries should have a range of rechargers including mains power and solar options.
 - **Braille paper:** Is thicker than normal paper. This type of paper is required for some devices and is generally more expensive than normal paper. When braille is produced using braille paper it tends to last longer.



2. Summary of features to look for

| | Features to look for |
|------------------------------------|--|
| Braille Slate and Stylus | <ul style="list-style-type: none">✓ Pocket and full page style slates with included stylus✓ Aluminium (stronger) or high quality plastic (cheaper)✓ Spare stylus |
| Braille typewriting machine | <ul style="list-style-type: none">✓ Ensure spare parts are available and accessible✓ Compatible with locally available, affordable paper |
| Braille note taker | <ul style="list-style-type: none">✓ Locally available or rechargeable batteries✓ Built in output (braille display or voice synthesiser) or compatible with existing device (computer with braille display or voice synthesiser) |
| Refreshable braille display | <ul style="list-style-type: none">✓ Compatible with Windows and screen reader software✓ USB and / or Bluetooth interface options✓ Portable✓ Locally available or rechargeable battery |
| Braille Embosser (Printer) | <ul style="list-style-type: none">✓ Compatible with Windows operating systems✓ Included, or compatible with free, translation software✓ Compatible with mains power supply✓ Compatible with locally available, affordable paper |



Annex 13: Procurement checklist for: **Low vision computer Assistive Technology**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises some things to consider when procuring low vision computer AT for PNG.

This procurement checklist provides some general information about procuring computer AT. As there is a large range of options, and the individual needs of users vary considerably, procurement is best made in consultation with personnel with experience in computer access for a person with a vision impairment. The suggestions below should be used as a general starting point only.

1. Selecting products

Think about the following factors when making procurement decisions for low vision computer AT:

- **Compatibility:** Devices should be compatible with existing computer systems. In most cases this will be a Windows operating system and Microsoft Office software.
- **Training:** When selecting software ensure there is an accessible training option for users.
- **Offline use:** Ensure that any software is able to be used offline (without internet).
- **Technical support:** Make sure there is reliable and accessible technical support available to users.

2. Summary of features to look for

| | Features to look for |
|--------------------------------------|--|
| Big keyboards and key board stickers | <p>For big keyboards and keyboard stickers:</p> <ul style="list-style-type: none"><input checked="" type="checkbox"/> High contrast colours with option of black letters on white background OR white letters on black background <p>For big keyboards:</p> <ul style="list-style-type: none"><input checked="" type="checkbox"/> Quiet key tapping<input checked="" type="checkbox"/> Compatible with Windows operating systems<input checked="" type="checkbox"/> USB connection<input checked="" type="checkbox"/> Programmable short cut keys |



Screen magnification and screen reader software



Features to look for

For both screen magnification and screen reader software:

- ☒ Compatible with Windows operating systems
- ☒ Good technical support and local training options
- ☒ Ease of use
- ☒ Updates readily available

For Screen reader:

- ☒ Compatible with spoken language (local PNG languages unlikely to be available).



Annex 14: Procurement checklist for: **Optical Assistive Technology**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises the things to consider when procuring optical aids for PNG. Optical AT includes devices that help to make objects, text or pictures appear larger through magnification. Examples of optical AT include magnifiers and telescopes.

There are many different types of optical AT for people with low vision. This procurement checklist provides some general information about procuring some more commonly used AT. To procure an appropriate range of low vision AT that will have maximum benefit for PNG people with low vision, input from personnel with specialist experience in low vision AT, particularly in contexts such as PNG, would be very useful.

1. Selecting products

Think about the following factors when making procurement decisions for optical assistive technology:

- **Device type:** People with low vision may need different optical AT for different activities. When selecting optical AT aim to have a range of AT that includes devices that help with:
 - Viewing or reading close objects (hand held magnifiers, stand magnifiers, electronic magnifiers)
 - Viewing distant objects (telescopes, electronic magnifiers)
 - Hands free use (stand magnifiers, some electronic magnifiers)
- **Lens size:** Select a range of lens sizes to suit the needs of all clients. The size of the lens determines how much of the object the viewer can see at one time. The size of the lens also directly relates to the amount of magnification of the device.
 - Large lens size = smaller magnification
 - Smaller lens size = larger magnification

A variety of lens sizes will be needed to help people with different amounts of vision impairment and for different activities. For example, for reading, the largest lens size that is appropriate for the user is preferred as this gives the largest field of view (see below). However for activities where precision is needed a smaller lens size that offers stronger magnification and a smaller field of view may be best. A smaller lens may also be preferred so that it is small enough to fit into a pocket or purse.




- **Magnification:** The amount of magnification is the ratio between the size of an object as it seems through the magnifier and the actual size of the object. Most magnifying devices only have a single magnification strength relative to the lens size. However electronic magnifiers can offer a range of magnification levels. Selecting devices in a range of lens sizes will result in a range of magnification levels being available.
- **Diopter:** This term is similar to the amount of magnification as it refers to the optical power of the device. The higher the diopter the higher the amount of magnification. The diopter is approximately equal to the amount of magnification multiplied by four. Selecting devices in a range of lens sizes will result in a range of diopter levels being available.
- **Focal length:** The focal length of a device refers to the distance from the magnifying lens to the object being viewed when the object is in focus. The






higher the amount of magnification the smaller the focal length of the device and the smaller the margin in which the object will remain in focus. Focal length is dependant on the lens size, however is variable in electronic devices.

- **Field of view:** This refers to the magnified area that you can see through the lens. Generally the larger the magnification, the smaller the lens and therefore the smaller the field of view.
- **Lens material:** Lenses are generally made of either glass or acrylic. Acrylic is preferred as it is lighter, less likely to break or shatter and is of lower cost.
- **Light source:** Many magnifying devices come with a built in light source. LED lights are best as they tend to be brighter, not as hot and use less power than other types.
- **Batteries:** Devices requiring power should utilise batteries that are locally available. Keep in mind users access to mains power may be limited and that solar recharge may be more appropriate.
- **Spare parts:** When procuring optical AT, also procure a quantity of the most commonly needed spare parts. These include; batteries and globes.

2. Summary of features to look for

| AT type | Features to look for |
|---|--|
| Hand held magnifiers  <i>Visulette</i>  <i>Hand magnifier</i> | <p>For all hand held magnifiers:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Light weight <input checked="" type="checkbox"/> Acrylic lens <input checked="" type="checkbox"/> Protective case or sleeve <input checked="" type="checkbox"/> Magnification range of 2x – 10x <input checked="" type="checkbox"/> Small enough to fit into pocket or bag <input checked="" type="checkbox"/> Durable frames (if applicable) <p>For devices with lights:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> LED lights <input checked="" type="checkbox"/> Batteries that are locally available |
| Stand magnifier  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Stable, strong frame <input checked="" type="checkbox"/> May be fixed height at best focal length for reading OR adjustable position for different tasks <input checked="" type="checkbox"/> The need for an additional reading stand <input checked="" type="checkbox"/> Whether the device is portable <input checked="" type="checkbox"/> Magnification range 3x to 10x <p>For devices with lights:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> LED lights <input checked="" type="checkbox"/> Batteries that are locally available |



| AT type | Features to look for |
|--|---|
| <p>Video magnifier</p>  <p><i>Hand held video magnifier</i></p>  <p><i>Stand video magnifier</i></p> | <p>For all video magnifiers:</p> <ul style="list-style-type: none"> <li>✓ Batteries that are locally available <li>✓ Range of: magnification, colour, contrast, glare control <li>✓ Auto focus <li>✓ Image capture and real time magnification <li>✓ On going technical support and software upgrades. <p>For hand held video magnifiers:</p> <ul style="list-style-type: none"> <li>✓ Portability of the device <p>For stand video magnifiers:</p> <ul style="list-style-type: none"> <li>✓ Compatibility with computer or external screen <li>✓ Zoom lens camera <li>✓ Camera and stand for required task (desk top or distance viewing) <li>✓ Appropriate size screen |
| <p>Telescope (monocular or binocular)</p>  | <ul style="list-style-type: none"> <li>✓ Magnification levels 2x – 10x <li>✓ Protective case or sleeve <li>✓ Neck or wrist strap for ease of use <li>✓ Lightweight <li>✓ Acrylic lens <li>✓ Durable frame |



Annex 15: Procurement checklist for: **Low vision non-optical Assistive Technology**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises the things to consider when procuring low vision non-optical AT for PNG. Non-optical AT includes devices that help users by changing light, assisting with reading and writing activities or carrying out daily activities.


There are many different types of non-optical vision AT. This procurement checklist provides some general information about procuring these types of devices, and some specific things to consider for some non-optical vision AT. This should be seen as a starting point only. More detailed advice from a person with experience in prescribing low vision AT will help to procure the right AT for PNG.

1. Selecting products



Think about the following factors when making procurement decisions for low vision non-optical AT:

- **Power source:** Devices that need power should use batteries that are locally available. Keep in mind that users may have limited access to mains power. In this situation, solar recharges may need to be sourced.
- **Local production:** Consider local production of non-optical AT such as reading and writing stands and reading slits. Local production will reduce costs and allow greater customisation to users needs.
- **Spare parts:** When procuring non-optical AT, also procure a quantity of the most commonly needed spare parts such as, batteries.

2. Summary of features to look for

| Type of AT | Features to look for |
|--|--|
| Reading lamp  | <ul style="list-style-type: none"><input checked="" type="checkbox"/> LED globes (brighter light)<input checked="" type="checkbox"/> Solar charged (where electricity is not reliable) |
| Glasses with light filters and/or polaroid coating | <ul style="list-style-type: none"><input checked="" type="checkbox"/> Polaroid, acrylic lenses<input checked="" type="checkbox"/> Wrap around design to reduce side glare<input checked="" type="checkbox"/> Size range to fit children and adults<input checked="" type="checkbox"/> Designs that fit over prescription glasses<input checked="" type="checkbox"/> Lightweight frames |



| Type of AT | Features to look for |
|---|--|
| Reading and writing stand  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Plastic or wood construction <input checked="" type="checkbox"/> Angle adjustment <input checked="" type="checkbox"/> Light weight and able to be packed flat for easy transportation <input checked="" type="checkbox"/> Local fabrication |
| Reading slit  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Durable black cardboard or thin plastic <input checked="" type="checkbox"/> Variety of sheet and slit sizes for different page and text sizes <input checked="" type="checkbox"/> Local fabrication |
| Talking devices (e.g. watch, clock, calculator) | <p>For all talking devices:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Appropriate spoken language (Tok Pisin and other local languages unlikely to be available). <input checked="" type="checkbox"/> Locally available batteries <p>For talking clock and calculators:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large buttons in contrasting colour <p>For talking watch:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Sizes for small and large wrists <input checked="" type="checkbox"/> Secure strap <input checked="" type="checkbox"/> Sleep mode <input checked="" type="checkbox"/> Recessed setting buttons |



Annex 16: Procurement checklist for: **Low vision orientation and mobility Assistive Technology (white canes)**

Procurement of AT includes: Identifying what AT is needed for the population of possible users; finding reliable suppliers; assessing and comparing different options to select the most appropriate AT (or range of AT). Procuring can include receiving donated AT as well as purchasing AT. This checklist summarises the things to consider when procuring priority low vision orientation and mobility AT for PNG. Orientation and Mobility AT includes white canes that help people with low vision to mobilise independently in the community. This procurement checklist covers two types of white canes:

- **Identification cane:** used to indicate to others that the user has a vision impairment
- **Mobility cane:** assists the user to safely find their way

Some people with low vision may use a 'support cane' (walking stick) for physical stability. It may be white, in order to identify that the person has low vision. For procurement considerations, see the procurement checklist for walking aids.

1. Selecting products

Think about the following factors when making procurement decisions for orientation and mobility AT:

Size range: Select a range of sizes in each device to make sure that clients of different ages and heights can be correctly fitted. Height adjustable products are suggested where possible as they reduce the total number of different stock items required.

Weight of the product: Lightweight devices are easier for people to use. The weight depends on the materials used to make the walking aid. The lightest material is aluminium for support canes and aluminium, fibreglass or carbon fibre for identification and mobility canes.

Strength: Select devices that are lightweight yet still strong. Aluminium devices are preferred. This is because ultra-lightweight materials such as carbon fibre and fibreglass can be easily broken and tend to be more expensive.

Contoured handgrips: Contoured, soft handgrips make the device more comfortable to use and reduce the pressure on palms and wrists.

Tips for identification canes and mobility canes: Tips for identification and mobility canes are a consumable item and will require regular replacement (about every 3-4 months depending on use). Make sure the tips chosen fit the canes being ordered. Canes should have the same type and size of tip attachment, to allow the same tips to be used on the different style canes. Different types of tip are available including:

- **Pencil tip:** This tip gives good sensory feedback, is lightweight, and good for users who have problems moving their wrists. Pencil tips can get stuck in cracks and on rough ground.
- **Pear shaped tip:** This tip has similar features to the pencil tip, however is better on rough ground as the surface area of the tip is bigger.
- **Rural ball:** This tip is a good choice for use on rough or uneven surfaces as it won't get stuck in cracks. This tip is heavier than pencil or pear tips, so for some users may not be preferred.
- **Rotating ball tip:** This tip rolls over cracks and rough ground. However, it does not provide as much feedback about small changes in the terrain. The rotating ball tip is heavier than the other tips above. An important





consideration in rural / rough terrain areas is that the bearing inside the tip (which allows it to roll) can be affected by sandy or dusty conditions.

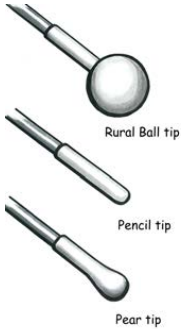
Spare parts: When procuring low vision orientation and mobility AT, also procure a quantity of the most commonly needed spare parts. These include:

- Tips (see above). Each device will need its tips replaced 3-4 times per year,
- Nuts and bolts used for height adjustment

2. Summary of features to look for

| Type of cane | Features to look for |
|---|--|
| All white canes | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lightweight (quality aluminium) <input checked="" type="checkbox"/> Wrist strap <input checked="" type="checkbox"/> Spare tips <input checked="" type="checkbox"/> White colour with red reflective strip <input checked="" type="checkbox"/> Attachment point for tips to be standard across all white canes |
| Identification cane  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Length adjustable or different lengths to suit range of adults <input checked="" type="checkbox"/> Folding for storage and transport |
| Mobility cane  | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Size range from 110cm to 160cm for adults and 55cm to 80cm for children <input checked="" type="checkbox"/> At least one type of: <ul style="list-style-type: none"> • Rigid (non-folding) canes (stronger with improved sensory feedback) • Folding or telescoping canes (easier to store and transport, but are not as strong and offer less sensory feedback) |



| Type of cane | Features to look for |
|--|---|
| <p>Tips</p>  <p>Rural Ball tip</p> <p>Pencil tip</p> <p>Pear tip</p> | <p><input checked="" type="checkbox"/> Ideally stock at least one type of:</p> <ul style="list-style-type: none"> • Pencil tip • Pear tip • Rural ball tip <p>(Additionally, a rotating ball tip may be a useful option for some users. However, this tip may not be durable in PNG as it can be damaged by dusty / sandy conditions. Trials are recommended.)</p> |



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