What is assistive technology?

Assistive technology

The application of organized knowledge and skills related to assistive products, including systems and services. Assistive technology is a subset of health technology.

Assistive products

Any external product (including devices, equipment, instruments or software), especially produced or generally available, the primary purpose of which is to maintain or improve an individual’s functioning and independence, and thereby promote their well-being.

Assistive products are also used to prevent impairments and secondary health conditions.

WHO Priority assistive products list, 2016 (Image credit: WHO GATE)
At least 1 billion people in the world in need of assistive technology (AT) and expected to double by 2030.

- Very limited data on need AT globally.
- Lack of reliable data on AT need in different settings.

### WHO estimates of need, unmet need and low coverage in LMIC

<table>
<thead>
<tr>
<th>DOMAIN</th>
<th>ASSISTIVE PRODUCT</th>
<th>NEED</th>
<th>UNMET NEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>VISION</td>
<td>Glasses</td>
<td>970 million people</td>
<td>Over 200 million people do not have access to spectacles or other low-vision devices.</td>
</tr>
<tr>
<td>HEARING</td>
<td>Hearing aids</td>
<td>466* million people</td>
<td>Products productions meets only 10% of global need and 3% of the need in low-income countries.</td>
</tr>
<tr>
<td>MOBILITY</td>
<td>Wheelchair</td>
<td>75 million people</td>
<td>Only 5–15% of the population has access to one.</td>
</tr>
</tbody>
</table>

* WHO Assistive technology factsheet, 2018 (Image credit: WHO GATE)
Approaches to measuring population-level AT

AT assessment is complex

Different approaches

- Partly depends how impairments, functioning and AT are defined, conceptualised, screened and measured.

- Survey tools
  - Participants’ self-report.
  - Detailed clinical assessment.
  - Combination of two approaches.
## Methods

### Population-based AT measurement approaches

<table>
<thead>
<tr>
<th>METHOD</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Single question</td>
<td>‘Do you think that services/APs, like hearing aids or walking sticks, would be helpful for you?’</td>
</tr>
<tr>
<td>Self-reported</td>
<td>Participants self-report of i) functional limitations and ii) associated need for AT amongst people who report functional difficulties.</td>
</tr>
<tr>
<td>Clinical impairment</td>
<td>Standardised population-based methods for measuring clinical impairment and AT need.</td>
</tr>
<tr>
<td>assessment</td>
<td></td>
</tr>
<tr>
<td>Functional assessment</td>
<td>Combination of self-reported and clinical based data incorporating ICF components. <em>To be developed for all six domains.</em></td>
</tr>
<tr>
<td>Indirect source</td>
<td>Uses data from the prevalence or incidence of related pathologies or conditions that were most strongly correlated with use of AP.</td>
</tr>
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*Boggs et al, 2019 WHO GReAT Consultation Background paper (Image credit: WHO GATE)*
Tools available to measure AT need, unmet need & coverage

Self-reported WHO tools

Model Disability Survey (MDS)  GATE Assistive technology assessment needs (ATA-N) (adapted WGSS as initial screening)

Clinical impairment assessment

- ICED India and Cameroon research (*Mactaggart et al*)

Functional assessment

- To be developed at population-level.

Indirect source

- WHO regional office Tajikistan study

*Boggs et al, 2019 WHO GReAT Consultation Background paper; WHO; Mactaggart et al, 2015* (Image credit: WHO MDS and rATA)
Two population-based district level disability surveys in India and Cameroon (2013-14) investigated relationship between self-reported functional limitations & objectively-screened clinical impairments.

**Objectives:** To conduct secondary analysis of district level disability surveys in India and Cameroon:

1. To estimate the population use, unmet need, total need and coverage for 3 ATScale priority APs (distance glasses, hearing aids and wheelchairs) in each setting.
2. To explore relationship between data on AP need captured through self-report and clinical impairment assessment.

**Methods**

- Survey data collected: Self-reported functional limitations, clinical impairment assessment, and self-reported AT need.
- Data analysis: STATA 15.
Data analysis

Calculated for each AP (distance glasses, hearing aid and wheelchair):

- **Use**: use of AP/total study population.
- **Unmet need**: need AP (but not using)/total study population.
- **Total need**: using or needing AP/total study population.
- **Coverage**: use of AP/total need.

Stratified ‘total need’ estimates for distance glasses and hearing aids by age and sex.


Boggs et al, 2019 WHO GReAT Consultation Background paper ;Mactaggart et al, 2016 Mactaggart et al, 2016 (Image credit: ICED)
Prevalence of need increased significantly with age but not significantly by gender, i.e. in older adults 60+ years distance glasses increased to 8.2% and 4.4% and hearing aids to 20.7% and 7.7% in India and Cameroon respectively.

Boggs et al, 2019 WHO GReAT Consultation Background paper (Image credit: WHO GATE)
Results: AP need relationship between self-report and clinical impairment

Amongst those who needed AP

INDIA

Cases (moderate vision impairment) who need distance glasses (n=10)

- Reported needing glasses (n=4)
- Reported not needing glasses (n=6)

Cases with hearing impairment who need hearing aids (n=102)

- Reported needing a hearing aid (n=62)
- Reported not needing a hearing aid (n=26)
- Reported not knowing what a hearing aid is (n=10)
- Reported using a hearing aid (n=4)

CAMEROON

Cases (moderate vision impairment) who need distance glasses (n=15)

- Reported needing glasses (n=6)
- Reported not needing glasses (n=6)
- Reported using glasses (n=3)

Cases with hearing impairment who need hearing aids (n=38)

- Reported needing a hearing aid (n=18)
- Reported not needing a hearing aid (n=9)
- Reported not knowing what a hearing aid is (n=11)

Boggs et al, 2019 WHO GReAT Consultation Background paper (Image credit: WHO GATE)
Results: AP need relationship between self-report and clinical impairment

Amongst those who self-reported needing AP

**INDIA**

Cases (moderate vision impairment) who reported needing distance glasses (n=60)

- Refractive error (n=15)
- Cataract surgery (n=28)
- No vision impairment (n=17)

**CAMEROON**

Cases (moderate vision impairment) who reported needing distance glasses (n=69)

- Refractive error (n=6)
- No vision impairment (n=35)
- Surgical complications (n=1)
- Other post segment/CNS (n=9)

Cases who reported needing a hearing aid (n=90)

- Need a hearing aid (n=62)
- Do not need a hearing aid (n=28)

Cases who reported needing a hearing aid (n=54)

- Need a hearing aid (n=18)
- Do not need a hearing aid (n=36)

Boggs et al, 2019 WHO GReAT Consultation Background paper (Image credit: WHO GATE)
International Classification of Functioning, Disability and Health (ICF)

Prevailing WHO framework for measuring health and disability at both individual and population levels

Functional needs tool

Combination of tools measuring impairment and assessing function in line with the ICF to estimate service and assistive product needs for a wider population.

Environmental Factors

Personal Factors

ICF, 2001 (Image credit: ICF)
Functioning assessment

Provide a holistic picture of individuals’ abilities and daily living skills

3 HEALTH INDICATORS

1. Mortality
2. Morbidity
3. Functioning!!

Approx. 2.4 billion*

* gross estimates from GBD data

(Image credit: WHO DAR)

Quinn et al, 2011; Desrochers and Fallon, 2013; WHO, 2011; WHO DAS

Well-aligned with the ICF. Typically include physical, cognition, mood, and carer related matters. Can use a variety of approaches, including indirect, observational, and experimental/functional analysis procedures. Commonly used in the rehabilitation sector. Existing functional assessments primarily measure individual-level functioning, and few exist for population-level measurement with most relating to disability through self-report only without assessing AT need (e.g. WHO Disability Assessment Schedule).
Proposed all-age survey tool

- POPULATION
- ENUMERATION TOOLS/FORMS
  - HH FORMS
  - WASHINGTON GROUP QUESTIONS + CLINICAL SCREENING
    - CLINICAL ASSESSMENT TOOLS
      - VISION
        - Peek
      - HEARING
        - HearX
      - MOBILITY
        - RAM
      - COMM
        - TBD
      - COGN
        - TBD
      - SELF-CARE
        - TBD

- INDIVIDUAL
  - TBD

- Only if screens yes in domain/s
- Only if meet clinical domain/s assessment/s criteria
- Clinical recommendation, across domain key (*AI*)
- Services (i.e. follow-up)
Next steps ...

Need to close the AT data gap by building up the evidence base.

- Requires the development of hybrid tools compatible with the ICF.
- All-age population-level AT estimates of need, unmet need and coverage.
- Systematic use to enhance comparability between settings and over time.

LSHTM AT2030 research

- Complete data analysis from The Gambia and Turkey surveys
- With AT2030 partners, develop AP decision trees (WHO & GDI) and bespoke mobile survey app (GDI).
- Full six functional domain survey planned Q3 2020 in Kenya.
THANK YOU!