Welcome valued participants and WHO delegates
The global context

Moderator: Rory Cooper
University of Pittsburgh
Welcome address

Sue Hill, Director, Department of Essential Medicines and Health Products, WHO
WHO and Assistive Technology (AT)

Sarah Garner, Coordinator: Unit of Innovation, Access and Use
Session 1

The GATE initiative and the GREAT Summit

Chapal Khasnabis

3 & 4 August 2017, Geneva
Session 1

What AT means to us and what we need from the GREAT Summit

• Gopal Mitra
• Sana Hafeez
• Thomas Ongolo
• Tom Nabarro
• Arnt Holte
• Joshco Wakaniyasi
• Diana Hiscock
• Chris Holmes
GREAT Summit 2017

Assistive Technology for people with Disability due to Spinal Cord Injury (SCI)

Tom Nabarro

A  Background
B  What people with our disability can get from AT
C  What more we want and how it would benefit us
D  Summary

3 & 4 August 2017, Geneva
Background: 2006 Before the Accident

- With my Dad in New York New Years’ Eve
Background: 2007 with my brother Oliver in Stoke Mandeville Hospital after accident
What I get from AT:
Inside my vehicle and set up for work
Looking ahead: Brain Computer Interfaces
2015 Zurich CYBATHLON WITH Team Imperial
Looking Ahead: Maintaining an Active life 2014 with friends in Italy
Looking ahead: With my wife Ellen 2016
Session 1

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What AT means to HelpAge International
- what we need from the GREAT summit

Diana Hiscock
HelpAge International
Accessibility - driving the inclusion agenda forward...

INCLUSION of Older People and People with Disabilities

Accessibility
Rights
Empowerment and participation
Non discrimination and equality
Diversity
Dignity
Assistance and support
The world we want is one where every older woman and man, everywhere, can say:

• "I have the income I need"
• "I enjoy the best possible health and quality of life"
• "I am safe and secure, free from discrimination and abuse"
• "My voice is heard"

= promoting inclusion through accessibility and participation

= increasing know how to use and access assistive technology
Abate Fulas Kelecha, Ethiopia - assistive aids make me forget that I am person with disability as I am fully engaged in all aspects of life

I use elbow crutches, a raised shoe (right foot), a total artificial hip replacement in 1995 (left hip), eye glasses for over 30 years.

I resourced them by a combinations of donation by a friend, family members and own funds.

I use my assistive aids always; they are part of my body.

Without my assistive aids, my daily activities, like bathing clothing, walking around the house, toileting, managing own medications, will be challenging if not impossible.

My livelihood, like going to work (HA staff), shopping, going to market, managing own finances will be unthinkable.

There are very few services in Ethiopia.
Jane Miano, wheelchair user - my experience as a Voluntary Community Worker in Kenya:

Every other day I receive a request for some Assistive Device, especially a wheelchair

- for a person with disability
- a parent of a child with disability
- a relative of an older person - especially those getting disabled due to NCDs

A donated wheelchair may not meet set standards or fit but definitely a relief to the needy recipient and families

Solutions to work together on -

- Promote governments involvement to address affordability and quality
- Promote collaboration of all stakeholders
- Improve the infrastructure which is key to usability
- Curb the entry of the sub-standard wheelchairs into the countries
- Promote training on fitting at all levels
- Carry out a survey on the availability of the Assistive Devices
- Engage universities for such a survey for credibility
Meet Miano & Sharon’s – access to community life

3 & 4 August 2017, Geneva
Meet Lydia and Irina – access to aids for daily living using local solutions
Promote accessibility for all
More thinking on using accessibility audits
Session 2

Research: group work on GATE thematic research areas

Summit Facilitators:
Marcia Scherer & Mac MacLachlan

University of Rochester and Maynooth University

3 & 4 August 2017, Geneva
Rapid overview GATE thematic research areas

Marcia Scherer & Mac MacLachlan
“Transformative”

“to undergo a change in form, appearance, or character”
The global AT Research Agenda

Luc de Witte
THE GLOBAL AT RESEARCH AGENDA

Luc de Witte
University of Sheffield and AAATE
Why a global AT research agenda?

• AT is under researched: we don’t know enough
• The challenges and knowledge gaps are global
How was the agenda developed?

• Online questionnaire among experts and organisations in the AT field worldwide
• A GATE meeting with 64 experts
• A smaller meeting with a sub-set of participants to discuss and ‘condensate’ the results of the expert meeting
• A draft agenda and a feedback round among everyone involved in any stage
What is the research agenda?

1. Effects, costs and economic impacts of AT
2. Policies, systems, service provision models and best practices
3. Development of high-quality and affordable AT products
4. Capacity building and human resource deployment for AT services
5. Development of standards and methodologies for the assessment of AT related needs
Guiding principles for research

• End users must be involved in all aspects of research, policy and service delivery
• Work from a social and environmental model of disability and functioning
Priority domains of functioning

• Mobility
• Self-care
• Communication
• Memory and cognition
What next?

• International research on these topics should be stimulated: specific international funding schemes?

• My top priority would be to set up a network of AT centers in different countries, sharing expertise, methods, information etc…. with the aim to assure high quality advise and service to people who might need AT

• You and I can take initiatives: who joins me in this?
BREAK OUT GROUP SESSIONS

1. What is needed for research to be able to answer the key questions?

2. What’s the next step?
Session Supporters Day 1

Group 1 (People): MARYAM
Group 2 (Products): DIANE
Group 3 (Provision): NATASHA
Group 4 (Personnel): EMMA
Group 5 (Policy): SATISH
Access the live captioning on your own device at https://synchshare.de/who

Join the free and open Wi-Fi network

#WHO_WIFI
Session 3

Feedback from the five group Rapporteurs

Discussion led by Moderator
Need for and benefit of an AT research infrastructure

Mac MacLachlan
GREAT Summit 3 & 4 August 2017 Geneva

Mac MacLachlan
Maynooth University

GATE Research & Innovation Coordinator
“Transformative”

“to undergo a change in form, appearance, or character”
• How it’s structured,
• How it looks,
• What it does
Assistive Technology should be transformative for individual’s capabilities & system capabilities
Framework for a coherent and coordinated world-wide development and operation of global research infrastructures
European Strategy Forum on Research Infrastructures, 2016

• “...capacity to address the research needs of world-wide scientific communities by combining the best available knowledge, human capital and resources in one specific scientific area with multi-source funding”
3 categories of research infrastructures of global relevance:

1. **Real single-sited global facilities** - geographically localized unique facilities whose **governance** is fundamentally **international** in character.

E.g. The Large Hadron Collider (LHC) at CERN.
2. **Globally distributed research infrastructures** - formed by national or institutional nodes, which are part of a **global network** and whose **governance** is fundamentally **international** in character.

E.g. Ocean observatories fleet.
• 3. National facilities of global interest - with unique capabilities that attract wide interest from researchers outside of the host nation. Existing research infrastructures with the potential for wide international utilisation.
GREAT Investment Landscapes

An Integrated Research System through the Global Collaboration on Assistive Technology (GATE)

1) Identify and Nominate which organisations/groups/networks are best placed to provide or develop what?

2) Identify and Plan the mechanisms most likely to facilitate open and effective interaction within and between research groupings;

3) Identity and Implement key process and outcome indicators for evaluating progress over a 10 year period.
Session 4

Innovation – comparative perspectives

Moderator: Alex Mihailidis
AGE-WELL Network of Centres of Excellence
Demand and supply

Hala Sakr, Adham Moneim & Malek Qutteina
A Rapid Assessment of Assistive Technology in the Eastern Mediterranean Region: Demand & Supply

Hala Sakr, Technical Officer, Violence, Injuries & Disabilities, Malek Qutteina, WHO Senior Consultant, & Adham Ismail, Regional Adviser, Health and Biomedical Devices (Sakrha@who.int; mqutteina@yahoo.com; ismaila@who.int)

(EMRO)
EM Regional Context

- Heterogeneity in income, development & emergency
- Key regional challenges:
  - No national AT service delivery systems
  - Lack of policies, programmes and financial resources
  - Inadequate needs assessment
  - Data limitations
  - Unavailability of services and human resources
Regional AT survey: A rapid assessment

- 1st step to operationalize resolution EM/RC63/R.3
- Adaptation of the global AT needs assessment tool
- Developed in consultation with technical teams across WHO
- 6 key components: Population data; Policy and Financing; Information and Research; Products; Personnel; and Service Provision
- Implemented in 17 EMR MS: 13 LMICs (7 of which are in emergencies) and 4 HICs
3.2% of EMR Population (~630 Millions) are disabled; of which 43% Females; 57% Males
AT Policies and Financing in EMR
## AT Products: Availability & Affordability

<table>
<thead>
<tr>
<th>Product</th>
<th>Availability</th>
<th>Affordability</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>National List</td>
<td>Technical Specs</td>
</tr>
<tr>
<td>Mobility</td>
<td>50%</td>
<td>48%</td>
</tr>
<tr>
<td>Vision</td>
<td>38%</td>
<td>48%</td>
</tr>
<tr>
<td>Hearing</td>
<td>32%</td>
<td>47%</td>
</tr>
<tr>
<td>Personal Care</td>
<td>31%</td>
<td>27%</td>
</tr>
<tr>
<td>Comm.</td>
<td>23%</td>
<td>24%</td>
</tr>
<tr>
<td>Cognition</td>
<td>14%</td>
<td>17%</td>
</tr>
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</table>
Next steps

- **Regional report** based on the AT rapid assessment
- **Regional action framework** and policy brief on improving access to AT based on regional survey findings and related WHO normative guidance
- **Regional Consultation** on Improving Access to AT in both development and emergency contexts
- **Focused country support** (action plans and implementation roadmaps including monitoring and evaluation)
Thank you
Market shaping

Emma Hannay
Market Shaping

Emma Hannay
The HIV response is a case study in addressing gaps in access to treatment

Number of people on HIV treatment
Millions

<table>
<thead>
<tr>
<th>Year</th>
<th>Number (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.7</td>
</tr>
<tr>
<td>2010</td>
<td>7.7</td>
</tr>
<tr>
<td>2016</td>
<td>19.5</td>
</tr>
</tbody>
</table>

SOURCE: WHO
Improving the markets for HIV commodities was a key part of the HIV response.

Price of first line antiretroviral medicines*
USD, per annum

* 2000: d4T/3TC/NVT; 2010 onwards: TDF/FTC/EFV

SOURCE: MSF Access campaign; WHO Global Price Reporting Mechanism

\[\text{\downarrow 99\%}\]
Commodity markets in health have a number of failings, impacting access.
Good practice example: Zero Project

Michael Fembek
Michael Fembek, Essl Foundation
Director of the Zero Project

A First Glimpse at the Nominations of the Zero Project 2018 on Accessibility
What is the Zero Project?

• Project of Civil Society, initiated by the Essl Foundation (Austria)

• Mission: “For a World without Barriers”, supporting the implementation of the UN CRPD
What does the Zero Project do?

• Research and selection of outstanding solutions to improve the life and legal situation of persons with disabilities: Innovative Practices and Innovative Policies of the Zero Project

• This year it is accessibility (other years of a four-year-cycle cover employment, education and independent living)

• All research is based on the Zero Project Network of experts: more than 3.000 persons with and without disabilities
Facts & Figures

• More than 3,000 experts taking part
• More than 1,000 nominations in 4 years
• 275 Innovative Practices and 60 Innovative Policies selected in the last 5 years
• More than 3,000 persons participated at the Zero Project Conferences
• 180 countries covered by the Social Indicators
Helm Foundation: Getting barriers out of the way

Egypt:
A comprehensive strategy to remove barriers, including venue navigation app, assessment of location, locating services and access to health
Accessible food markets

Indonesia:
Making vegetable and meat markets accessible for all
Mary Free Bed YMCA

United States:
A fully accessible youth hostel, first facility in the world to be certified by the Universal Design Commission.
Israel:
A wheelchair that can be merged with a baby stroller
Century City Properties: Tactile orientation map for malls

South Africa:
Tactile map for wayfinding in shopping centres and malls
United States:
A robot system enabling all people to actively participate in conferences around the world
Where we are

• 370 nominations (May/Jun 2017)
• 207 admitted nominations (Jul)
• 150 shortlisted nominations (experts are currently out!)
• 70 – 80 selected Innovative Practices and Policies of the Zero Project 2018 (Oct)
• Zero Project Conference (Feb 21 – 23, 2018) and Zero Project Report
• Zero Project Accelerator
Question and Answer Session
WHO AT assessment toolkit

Johan Borg
WHO Assistive Technology Assessment Toolkit

Johan Borg, WHO Consultant
ATA Toolkit

A range of tools to support countries to develop and monitor systems for effective provision of assistive technology, particularly with regards to WHO priority assistive products.

User needs
User outcomes
System capacity
System outcomes
ATA-needs

Tool for identifying population level needs for assistive products.

First version used in one country.

- Six domains
- Capacity
- Need for products
- Products in use
- Abandonment & barriers
ATA-capacity

Tool for determining country level capacity to provide assistive products.

Short version being tested.

Harmonized with other WHO tools.

- (Population)
- Policy, funding, information & research
- Products & suppliers
- Personnel & training
- Provision & providers
ATA-impact

Tool for assessing individual level impact of assistive products.

Systematic review of existing tools and conceptualization meeting conducted.

Tentative dimensions:
- Performance - activities, participation
- Quality of life & well-being
- Economy
ATA-impact: Systematic review

- Data bases: AMED, CINAHL, MEDLINE, Psychinfo
- Search: Combination of 4 concepts comprising 148 terms

- Hits: 2611
- Tools: TBA
## Next steps

<table>
<thead>
<tr>
<th>ATA-needs &amp; ATA-capacity</th>
<th>ATA-impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Development of β-versions</td>
<td>• Conceptualization and operationalization</td>
</tr>
<tr>
<td>• Development of digital version of ATA-needs</td>
<td>• Development</td>
</tr>
<tr>
<td>• Tests</td>
<td>• Validation</td>
</tr>
<tr>
<td>• Launch end of 2018</td>
<td>• Launch end of 2018</td>
</tr>
</tbody>
</table>
Operationalization of AT assessment toolkit

Liem Nguyen
Operationalization of WHO’s Assistive Technology Needs Assessment Toolkit (ATA-P) – example from Bangladesh

Liem Nguyen, PhD
Nossal Institute for Global Health, University of Melbourne
APAT & the pilot of APA-P in Bangladesh

• WHO’s AP Assessment Toolkit developed for planning and development of AP provision services: APA-P (population/need), APA-S (system/capacity), APA-I (impact)

• APA-P piloted as part of a 2016 Disability Survey:
  • AP questions in RAD were replaced by APA-P
  • Two districts: Kurigram & Narshindi; >4,200 adults
  • Tablet & KoBo Toolbox used for data collection

• Partners: Nossal Institute, GATE/WHO, Bangladesh Bureau of Statistics (BBS), HI Bangladesh
Operationalization of APA-P

• Reviewed APA-P & included as ‘module’ of RAD questionnaire
• Digitised using KoBo Toolbox
  • Digitised the questionnaire (build form)
  • Developed code to handle complex skip logic
• Translated, cognitively tested, piloted and finalized survey instruments
• Implemented survey
• Analysed data (see snapshot)
Challenges & Threats

• Length & complexity of APA-P

• Screening for functional difficulty: 5-point vs other tools, e.g. the WG

• Self assessment of unmet need: Validity? Could be verified using multimedia?

• Study design & sample size
  • Surveyed 4,253 adults → 31.9% (1,352 persons) have mild+ disability → 5.5% of them (75 persons) using an AP (50 persons for moderate+)
  → APA-P collected many information that could not be analysed
  → Analysis by domain or type of disability is not possible
Strengths & Opportunities

• Easy & feasible to use with local enumerators at scale
• Policy-relevant data: powerful results, rapid interpretation
• Worked well in digital format, i.e. KoBo Toolbox
• Potential for GIS data
• Links to other disability & health metrics, e.g. association between AP and health status (wellbeing) or community participation
Opportunities: GIS example

- Needs assessment mapping
- Link to service provision data (from APA-S)
- Link to road and topographic maps to learn about accessibility

Do you think you might benefit from an assistive product?
Recommendations: Next steps of APA-P

• Inform programming through a larger baseline study with a different **sampling strategy**, e.g. use ‘screening’
• Test **reliability** of APA-P
• Add media: photos, to confirm enumerator’s choice of AP
• Explore potentials of APA-P when linking with other data: health and wellbeing; GIS data; APA-S data
• Develop a **simple version at community level** (for CBR/ CBID/ PHC workers) linked to services and follow-up
International standards and the APL

Karl-Erik Westman & Joakim Falk
International standards and the Priority Assistive Products List.
Karl-Erik Westman and Joakim Falk
TC-173 Assistive products
TC-173

• What is ISO TC-173
• How ISO TC-173 normally work considering developing countries
• What is the Gate initiative
  • 25 priority product list
  • What can TC-173 do?
  • Standard or IWA (international Workshop Agreements)

An International Workshop Agreement is a document developed outside the normal ISO committee system to enable market players to negotiate in an “open workshop” environment. International Workshop Agreements are typically administratively supported by a member body. The published agreement includes an indication of the participating organizations involved in its development. An International Workshop Agreement has a maximum lifespan of six years, after which it can be either transformed into another ISO deliverable or is automatically withdrawn.
Standards for the whole world

• What benefit developing countries will also benefit all other countries.

• Annexes for special issues
Who work within standards

• Companies
• Researchers
• Professionals
• Agency
Future work

• To continue to work on the track that has started
• To look at assistive products and services in a wider perspective
• To look at universal design input
• To continue to create cooperation between TC’s
Advanced assistive technology

Michelle Johnson
Advanced Assistive Technologies for Low and Middle Income Countries

1-3 Michelle J. Johnson, PhD
1 Physical Medicine and Rehabilitation, University of Pennsylvania
2 BioEngineering, University of Pennsylvania
3 Rehabilitation Robotics Research and Design Lab (RRRD), Pennsylvania Institute of Rehabilitation Medicine

Located at 1800 Lombard street, Philadelphia, 19146, USA
Cardiovascular Diseases

• Cardiovascular diseases account for about 30% of NCD deaths which is about 17.7 million
• In 2010, 33 million people in the world live with impairments due to a stroke
• Two-thirds with stroke live in low-middle income countries
ADVANCED ASSISTIVE TECHNOLOGIES: Definition

• Any item, piece of equipment or product system whether acquired commercially or off-the-shelf, modified or customized that is used to increase, maintain or improve functional capabilities of individuals with disabilities.

• “An Rehabilitation Robot is a reprogrammable, multifunctional machine designed to function in an assistive or therapeutic capacity to aid persons with disabilities or diminished functional capacity.” — Modified Definition

Ch2: Intro to Rehab Eng. Cooper et al.
Therapy Robots

• Therapy Robots
  • Treat neurological disorders such as stroke and cerebral palsy.
    • Function to automate and deliver autonomous or semi-autonomous therapy for arm (or leg or joint)
    • Function to assess level of disability and impairment remaining in a limb arm (or leg)
    • Outcome >>> reducing motor impairment, increasing function and driving brain re-organization
  • Function in clinics or supervised settings
  • Maybe function at home

Commercial robots: Reo, InMotion, Lokomat
Assistive Robots

• Assistive Robots
  • Replace other functions or activities or things (e.g. surveillance robots)
  • Replace a loss limb (e.g., prosthetics)
  • Replace the function of a paralyzed limb and do tasks instead of the limb (e.g., wheelchair robot)

Experimental effort with Baxter, ARMs, NAO

3 & 4 August 2017, Geneva
Rehabilitation Robots in LMICs

• Must be Affordable
• Must be Multipurpose
• Must promote Community-based Rehabilitation
• Must be Effective
• Must be Appropriate
## What is Affordable*?

<table>
<thead>
<tr>
<th>Profile</th>
<th>Country</th>
<th>( A = ) GDP/capita (USD)</th>
<th>( B = 3^*\text{GDP/capita} ) (USD)</th>
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<tbody>
<tr>
<td>High</td>
<td>USA</td>
<td>53,072</td>
<td>159,216</td>
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<tr>
<td></td>
<td>UK</td>
<td>41,788</td>
<td>125,364</td>
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<tr>
<td>Upper-Middle</td>
<td>Mexico</td>
<td>10,307</td>
<td>30,921</td>
</tr>
<tr>
<td></td>
<td>Jamaica</td>
<td>5,290</td>
<td>15,870</td>
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<tr>
<td></td>
<td>Botswana</td>
<td>7,315</td>
<td>21,945</td>
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<tr>
<td>Low-Middle</td>
<td>Ghana</td>
<td>1,858</td>
<td>5,574</td>
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<tr>
<td></td>
<td>India</td>
<td>1,499</td>
<td>4,497</td>
</tr>
<tr>
<td></td>
<td>Vietnam</td>
<td>1,908</td>
<td>5,724</td>
</tr>
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</table>

*USE WHO Cost-Effective Thresholds

- **HIGHLY COST-EFFECTIVE** = < \( A \)
- **A > COST-EFFECTIVE** < \( B \)
- **UNREASONABLE** > \( B \)
Fig. 1. **Left:** The Haptic TheraDrive, a single degree-of-freedom robot for upper limb rehabilitation. **Right:** Screenshot of an interactive game the subjects can choose to play.

20 Stroke Subjects
- Ischemic stroke; hemiplegia >6 months post stroke
- No more than mildly cognitively impaired
- Various levels of function
- Control Group (CG) v. Robot Group (RG)
Rehab CARES is a portable compact system designed to support the upper and lower extremity and facilitate gait and balance training.
Using Upper Limb Kinematics to Assess Cognitive Deficits in People Living with Both HIV and Stroke

Kevin Bui, Roshan Rai, Michelle J. Johnson

- Cognitive and motor deficits in people living with both HIV and stroke are hard to separate
- Task performance error of the unimpaired limb may be a way to quantify cognitive deficits
Rehabilitation Robots in LMICs

- Must be Affordable
- Must be Multipurpose
- Must promote Community-based Rehabilitation
- Must be Effective
- Must be Appropriate

Building Rehabilitation Robots Appropriate for LMICs Starts with Partnerships

Sustaining Rehabilitation Robots in LMICs Depends on CAPACITY BUILDING
Journal of Rehabilitation and Assistive Technologies Engineering (RATE)

• An open access, peer-reviewed interdisciplinary journal focusing on the engineering aspects and their practical applications of rehabilitation and assistive technologies.

• View our published Special Collection on Affordable Rehabilitation and Assistive Technologies: bit.ly/RATE_affordable_rehabilitation

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