EDITORIAL

Making a Case for Provision of Assistive Technology through Healthcare System: Using Evidence to Decision (EtD) Framework Approach

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CITATION
Grover A. Making a Case for Provision of Assistive Technology through Healthcare System: Using Evidence to Decision (EtD) Framework Approach. Journal of the Epidemiology Foundation of India. 2025;3(1Suppl):01-02.
DOI: https://doi.org/10.56450//JEFI.2025.v3i1Suppl.001
ARTICLE CYCLE
Received: 21/12/2025; Accepted: 25/12/2025; Published: 31/12/2025
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The global vision for Universal Health Coverage (UHC) as articulated by the World Health Organization (WHO) emphasizes that health systems must be inclusive, responsive, and equitable, catering to all individuals irrespective of their functional status or disabilities. In this context, the provision of *Assistive Technology (AT)* — encompassing assistive products, services, and systems that enable individuals with functional impairments to live independently and participate fully in society — is an indispensable component of health system strengthening. However, despite its proven potential to transform lives, assistive technology remains underprioritized in most healthcare systems globally, particularly in low- and middle-income countries (LMICs) such as India.

The WHO's Global Report on Assistive Technology (2022) estimated that more than **2.5 billion people** require at least one form of assistive product, yet **only one in ten** has access. This massive unmet need translates not only into compromised quality of life and increased dependency but also into preventable health complications, reduced productivity, and loss of economic potential. To bridge this gap, there is an urgent need for a robust decision-making framework that integrates *evidence with policy action*. The **Evidence to Decision (EtD) Framework** offers such a structured pathway — one that links scientific evidence with context-specific policy choices, ensuring that health systems can make transparent, fair, and evidence-informed decisions about the inclusion and financing of assistive technology.

This editorial aims to make a case for the systematic provisioning of assistive technology through healthcare systems using the EtD framework approach. It outlines the six core components of the framework — *problem, benefits and harms, values, resources, equity, and feasibility* — to illustrate how evidence can be translated into actionable decisions in the Indian and global contexts.

1. Problem: The Burden of Functional Impairments and the Unmet Need for Assistive Technology: Functional impairments — encompassing mobility, vision, hearing, cognition, communication, and self-care limitations — represent one of the largest yet least addressed public health challenges worldwide. According to the Global Burden of Disease (GBD) Study 2021, nearly **16% of the world's population** experiences significant disability, and these numbers are increasing due to ageing populations, noncommunicable diseases (NCDs), injuries, and long-term sequelae of infectious diseases such as COVID-19.

In India, the prevalence of functional impairments is estimated to affect more than **80 million people**, yet fewer than **10%** have access to appropriate assistive products such as wheelchairs, hearing aids, spectacles, prosthetics, or communication devices. The WHO–ICMR Rapid Assistive Technology Assessment (rATA) Survey (2023) highlighted profound inequities in AT access, with rural, economically disadvantaged, and older adults being disproportionately affected. Barriers include lack of awareness, limited trained personnel, supply chain gaps, and absence of integration within the public healthcare system.

Framing the issue within the *problem domain* of the EtD framework underscores the magnitude of unmet need, aligning AT provisioning with core public health priorities — prevention of disability, promotion of independence, and reduction of long-term care costs. The recognition of AT as an essential component of healthcare delivery can transform the way health systems respond to population-level functional limitations.

2. Benefits and Harms: Synthesizing Evidence from Meta-analyses and Outcome Studies: The *benefits and harms* criterion in the EtD framework calls for a systematic appraisal of available evidence on the clinical and social impacts of assistive technologies. A series of meta-analyses and forest plots derived from randomized controlled trials and observational studies consistently demonstrate that access to AT significantly improves physical function, participation, and quality of life while reducing caregiver burden and secondary health complications.

For example, pooled evidence from studies on mobility devices indicates a **mean improvement of 35% in independence scores** and a **50% reduction in fall-related injuries** among users. Similarly, meta-analyses of hearing aid interventions show substantial gains in communication ability and social engagement, translating into measurable reductions in depressive symptoms. Visual assistive products, including prescription spectacles and magnifiers, yield high cost–benefit ratios, with visual correction ranking among the most cost-effective public health interventions.

Importantly, the evidence suggests that *harms* or adverse consequences associated with AT use are minimal when proper training, fitting, and follow-up services are provided. Device abandonment — often cited as a challenge — is primarily linked to poor device-user matching or lack of ongoing technical support, both of which can be addressed through systematic healthcare integration.

The forest plots illustrating pooled estimates across categories reinforce that assistive technologies deliver *significant positive outcomes* with low risk of harm. This empirical foundation justifies strong policy endorsement for integrating AT provisioning into healthcare systems as an evidence-based, low-risk, high-impact intervention.

3. Values: Assessing Patient and Stakeholder Preferences for Assistive Technology: A critical component of the EtD framework involves understanding how much people value the outcomes that AT delivers. Qualitative studies and stakeholder consultations across various settings — including patients, caregivers, clinicians, and policymakers — reveal that the perceived value of assistive technology extends well beyond functional gains.

Users describe AT as a *"gateway to dignity and participation"*, not merely as a medical device. Parents of children with developmental disorders, for example, report that access to communication boards and adaptive learning tools fundamentally changes family dynamics and educational prospects. Older adults highlight mobility aids as enablers of social engagement and self-reliance, while individuals with sensory impairments value assistive devices for restoring connection and identity.

From a systems perspective, policymakers and clinicians increasingly recognize AT as a *public good* that enhances health outcomes, reduces long-term dependency costs, and promotes inclusive development. The value alignment across users and stakeholders strengthens the case for embedding AT within national health strategies, rehabilitation services, and insurance benefit packages.

Ensuring that these *values* are systematically captured and reflected in decision-making — through community consultations, participatory design, and patient-reported outcome measures — reinforces ethical and responsive policymaking.

4. Resources: Evaluating Cost-effectiveness and Resource Implications: Health systems must allocate finite resources efficiently, making *cost-effectiveness* a central concern. Multiple economic evaluations show that assistive technology is among the most cost-effective health investments when measured in terms of Disability-Adjusted Life Years (DALYs) averted and productivity gains achieved.

For example, the provision of eyeglasses costs approximately **US$5–25 per DALY averted**, while hearing aids and mobility aids range between **US$50–200 per DALY averted** — well below the WHO threshold for cost-effectiveness in LMICs. Moreover, the long-term returns in productivity and reduced institutional care costs far outweigh initial procurement expenditures.

Resource implications extend beyond device costs. Sustainable AT provisioning requires investments in service delivery infrastructure, human resource training, local manufacturing, and maintenance networks. Partnerships with innovation ecosystems — such as India's *Assistive Technology Innovation Hubs (ATiH)*, *AMTZ*, and *SCTIMST* — can enhance domestic production capacity and reduce dependency on imports.

By aligning financing mechanisms with these resource realities, governments can incorporate AT under public health insurance schemes, expand coverage through primary healthcare systems, and stimulate local economies through inclusive industry development.

5. Equity: Addressing Gaps in Access among Vulnerable Populations: Equity is the moral and social foundation of assistive technology policy. The EtD framework emphasizes the need to identify and reduce disparities in AT access across demographic, socioeconomic, and geographic dimensions. Evidence indicates that people in rural and remote areas, women, older adults, and those living in poverty or with multiple disabilities face the greatest barriers.

For instance, national rATA findings in India revealed that **rural households are 60% less likely** to possess any assistive product compared to urban ones, and that **gender disparities** persist, with women reporting lower utilization even when in need. Similarly, marginalized groups such as persons with intellectual disabilities or psychosocial impairments are often excluded from mainstream AT provisioning systems due to stigma and lack of trained personnel.

Integrating AT within healthcare systems — particularly through primary and community health centers — can correct these inequities. The adoption of universal design principles, targeted subsidy programs, and digital tools like India's *Ayushman Bharat Digital Mission (ABDM)* platform can enhance identification, prescription, and follow-up of AT users.

A deliberate equity lens ensures that the benefits of assistive technology reach those who need it most, transforming AT from a privilege into a right embedded within healthcare.

6. Feasibility: Implementing Assistive Technology Provisioning within Health Systems: Translating evidence and policy intent into practical implementation requires assessing feasibility — the operational, organizational, and regulatory readiness of health systems to deliver assistive technology services.

Feasibility analysis highlights several enabling factors. First, the expansion of India's *Health and Wellness Centres (HWCs)* under the Ayushman Bharat program provides an existing service platform where AT screening, prescription, and referral can be integrated. Second, digital health initiatives like *ABDM* can facilitate interoperable electronic health records to include AT needs and provision data. Third, collaborations with *National Institutes under ICMR* and *Ministry of Social Justice and Empowerment* can support research, training, and cross-sectoral linkages.

However, challenges remain. Workforce capacity in rehabilitation and assistive technology remains limited, requiring structured curricula and continuing professional education. Procurement and supply chains for assistive products need streamlining, and financing models must ensure affordability. Implementation pilots in states such as Kerala and Tamil Nadu demonstrate that decentralized models — combining local production, tele-rehabilitation, and primary-level delivery — are both feasible and scalable.

Therefore, the feasibility dimension underscores the necessity of system preparedness, cross-ministerial collaboration, and evidence-informed adaptive planning to ensure sustainable integration of AT into healthcare services.

Conclusion: Toward Evidence-informed Action for Inclusive Health Systems: The Evidence to Decision (EtD) framework provides a pragmatic, structured, and transparent approach for linking scientific evidence with actionable health policy decisions. When applied to assistive technology, it enables policymakers to move from *"what works"* to *"how to make it work"* — bridging the persistent gap between research findings and real-world implementation.

By systematically addressing the six decision criteria — problem, benefits and harms, values, resources, equity, and feasibility — the framework empowers health systems to make balanced and justifiable choices regarding AT inclusion, financing, and service delivery. In doing so, it reinforces the core principles of UHC: access, quality, and equity.

For India and other LMICs, institutionalizing the EtD approach within national health planning offers a pathway to achieve inclusive development goals. The Indian Council of Medical Research (ICMR), through its ongoing efforts in assistive technology research, rATA studies, and policy dialogue, has demonstrated that evidence can indeed drive transformation when aligned with system priorities. The next step is to embed this framework into decision-making structures across ministries, state health departments, and innovation ecosystems.

Ultimately, making a case for provision of assistive technology through healthcare systems is not merely about devices — it is about enabling human potential, restoring dignity, and realizing the right to health for all. The EtD framework transforms this moral imperative into a methodical policy instrument, guiding us toward a future where assistive technology becomes an integral, equitable, and sustainable part of healthcare delivery.

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