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# **Executive Summary**

Autism Spectrum Disorder (ASD) is a significant global public health concern, estimated to affect approximately one in 100 children worldwide, and with an increasing prevalence in adults.<sup>1</sup>

This white paper explores the complex challenges that individuals with autism face, emphasising the crucial roles that technology and public policy play in bridging health equity gaps. It recommends comprehensive public policies that support broader societal inclusion and economic opportunities, along with improvements in healthcare access and quality.

This will ensure a holistic advancement towards health equity for individuals with autism, significantly enhancing their quality of life and accessibility of services, integrating their needs into the wider fabric of community and societal structures, and moving towards a more inclusive and equitable health landscape.

This paper is structured around four key sections:

1.

### The Impact of Social Determinants on Autism,

exploring how factors such as socioeconomic status, education, and community influence the health equity of people with autism.

3.

### Technology as an Enabler for Improving Health Equity for Individuals with Autism,

highlighting the role of technology and digital literacy in promoting equitable care, and showcasing a selection of autismtailored innovative technologies currently in use around the world.

2.

### Public Policy: Catalysing Improved Health Equity in Autism Care.

discussing the instrumental role of government and public policy in promoting health equity for individuals with autism.

4.

#### Actionable Public Policy Strategies for Technological Integration,

proposing a series of strategic recommendations for health authorities around the world on how technology may be better enabled through public policy to enhance the health equity of individuals with autism.

The white paper concludes with a call to action for stakeholders, including policymakers, healthcare providers, technology developers, and the autism care community, to collaborate in nurturing an ecosystem that not only addresses but anticipates the needs of individuals with autism. By aligning efforts across these domains, the paper advocates for a society where health equity isn't merely an aspiration, but a reality for all.









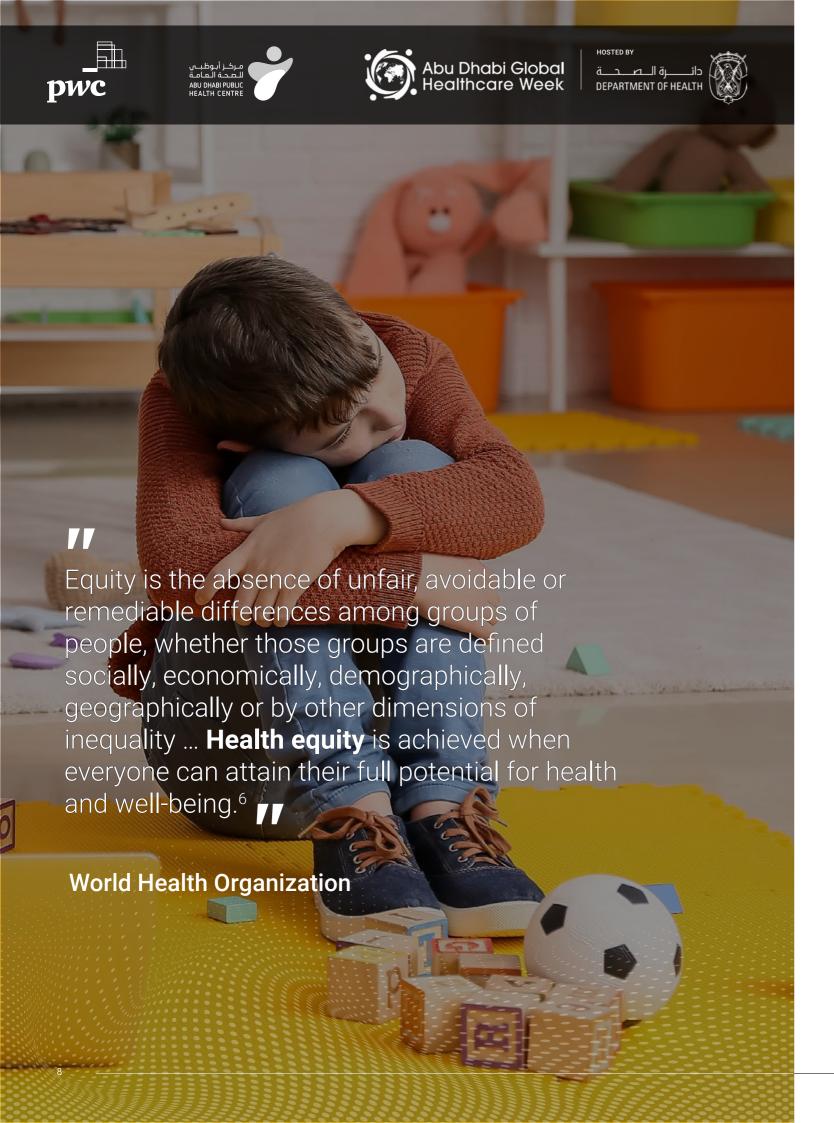
### Introduction

Autism is a complex neurological condition and developmental disorder characterised by challenges in social interaction and a tendency for repetitive behaviours.<sup>2</sup>

Although autism indicators generally appear within the first two years of an individual's life, autism is not limited to children and can occasionally go undiagnosed. Recent studies within the US, for example, indicate that the prevalence of autism among US children is 2.7%, but marginally lower in adults at 2.2%.<sup>3</sup> This research highlights the need for comprehensive autism care, as well as better detection, across all age groups.

The prevalence of this condition across the global community underscores the importance of achieving health equity for autistic individuals, ensuring they have equal access to the healthcare and social services afforded to the general population.<sup>4</sup> This includes tailored diagnostic services, early intervention, continuous healthcare support, and appropriate educational and employment opportunities.

A holistic approach to health equity also involves addressing the broader social determinants of health (SDOH). Factors such as economic stability, education quality, healthcare access, and social integration are pivotal in shaping health outcomes. This calls for cross-departmental collaboration on the development of comprehensive care strategies that encompass not only health policy, but also technological, educational, occupational, residential and environmental enablers.



Autistic individuals face unique challenges that extend beyond the direct symptoms of the disorder. They are at an elevated risk for several comorbid conditions, including anxiety, depression, and epilepsy, which can significantly impact their quality of life and longevity. Research indicates that the life expectancy of autistic individuals is up to 16 years less than that of their non-autistic counterparts, driven primarily by preventable health issues and a lack of autism-specific care.

Barriers to health equity for individuals with autism extend beyond healthcare to include significant socioeconomic hurdles and a pervasive lack of community support. Systemic issues compound these challenges, including inadequate healthcare training, overwhelming sensory environments in public spaces, and barriers in education and employment that deter autistic individuals from fully participating in society.











# The Impact of Social Determinants on Autism

Social determinants of health (SDOH) are the conditions in which people are born, grow, live, work, and age. They encompass five key factors, listed below, which are shown to have a significant impact upon an individual's health outcomes. <sup>10</sup> For children and adults with autism, who are individuals with special healthcare needs - often referred to as "people of determination" - SDOH play a crucial role in shaping their ability to access the level of medical care and services that supports their health equity.

According to the US National Survey of Children's Health, children with special needs, including those with autism, are nearly four times more likely to have unmet healthcare needs compared to their peers. This disparity, primarily due to factors like cost and limited appointment availability, extends into adulthood. Epidemiologist Dr. Jessica Rast emphasises that addressing these disparities is

a matter of equity: "If the people who need more care can't access it, we're disadvantaging a whole population." Therefore, examining and addressing these social determinants throughout the life journey of individuals with autism is essential for advancing health equity and ensuring they receive the comprehensive care required at every stage of life.

**Towards Health Equity:** Bridging the Gap for Individuals with Autism through Public Policy and Technology The Five Social Determinants of Health and their Impact on Autism **Economic Stability** Economic factors greatly influence the ability of adults with autism to achieve and maintain independence, as well as for families of children with autism to appropriately manage the condition. While families with higher socioeconomic status often have better access to resources crucial for early diagnosis and ongoing intervention, those on the lower end of the economic spectrum face significant challenges. The demands of caregiving can prevent full-time employment, reducing household income and further limiting access to necessary autism services and supports. For adults with autism, economic stability is closely tied to their ability to find and retain employment, which is often hindered by societal and workplace barriers, lack of appropriate support systems, and inadequate accommodations. 13

### Access To and Quality Of Education

Education is pivotal in the development and wellbeing of individuals with autism. Quality educational settings that provide tailored support can greatly enhance long-term health outcomes. However, educational disparities often mirror economic inequalities, with lower socioeconomic status correlating with reduced access to specialised educational resources.

This lack of access not only affects academic achievement but also limits social development and vocational training opportunities, essential for the independence and quality of life for autistic individuals. 14



socially and engage in community life. Unsafe or unsupportive

and discrimination, leading to increased isolation and stress. 16

neighbourhoods can exacerbate challenges such as social exclusion

### 5 Social and Community Context

Social inclusion and supportive community networks are essential for the mental health and social wellbeing of individuals with autism. Experiences of discrimination and social exclusion can lead to severe isolation, affecting mental health and reducing access to essential services. Building strong, inclusive communities that actively reduce stigma and promote understanding of autism can help mitigate these effects, providing a more supportive environment for individuals with autism and their families. <sup>17</sup> Collaborative community platforms, such as the Dubai Autism Center, provide opportunities for those within the community to connect with others, access educational resources, and advocate their needs within an empowering context. <sup>18</sup> In order to maintain inclusivity, it will be important for platforms such as these to support multiple languages, particularly within highly multicultural societies like the United Arab Emirates (UAE).









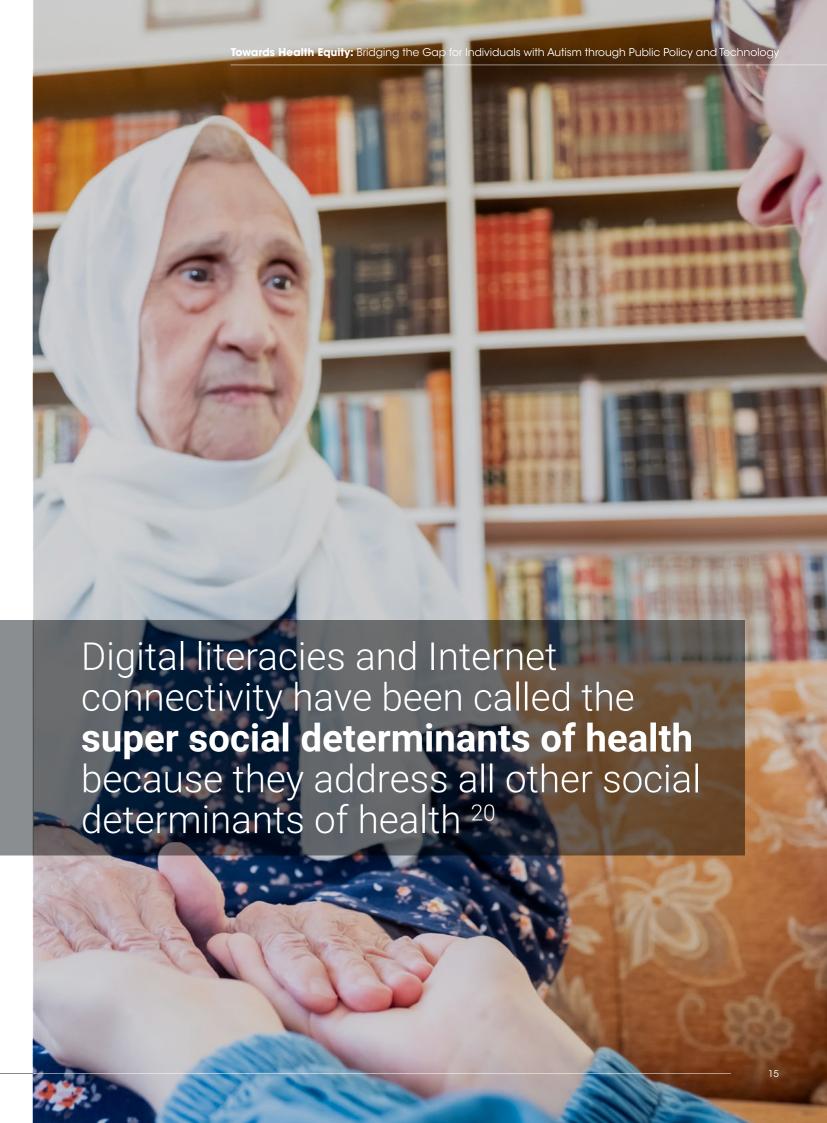


The Impact of Social Determinants on Autism

As children with autism transition into adulthood, the disparities initiated in their youth continue to impact their ability to effectively integrate into society. Adults with autism from underserved backgrounds often face challenges to secure employment and attain financial independence, crucial for their autonomy and self-esteem. The compounding effect of these challenges is substantial, leading

to increased social isolation and mental health issues, further exacerbating autism symptoms. Here, technology emerges as a "super social determinant of health," intersecting with and amplifying the impact of all other social determinants, detailed further in Section 3.1.<sup>19</sup>

Enhancing digital literacy and access becomes crucial, providing tools and resources that help mitigate lifelong challenges and improve quality of life for those affected by autism. Understanding these social determinants sets the stage for how targeted public policies can address these inequities, as explored in the next section.











# Public Policy: Catalysing Improved Health Equity in Autism Care

Public policy is crucial in shaping the landscape of support and care services available to individuals with autism. By addressing the social determinants of health, governments can create more supportive and inclusive environments for autistic children and adults, ultimately improving their mental and physical health outcomes and promoting equity. Policies can also be designed to foster innovation and access to technological solutions, such as those detailed in Section 3.

In recent years, numerous organisations around the world have called for greater government action in addressing the care needs of individuals with autism. The US National Autism Indicators Report emphasises an urgent need for policy improvement relating to autism care, particularly in preparing for public health emergencies. Their research has found that "autistic adults, aged 45 and older, had higher rates of visits to the emergency department and hospitalisations for COVID-19 compared to non-autistic adults, autistic children and younger adults (younger than 44)."<sup>21</sup>

This report calls for the development of policies that specifically address the vulnerabilities of autistic individuals during such crises, ensuring that they have continued access to necessary health and support services. The Global Autism Public Health Initiative similarly asserts the importance of public policy in enhancing equity for individuals with autism<sup>22</sup>, having established collaborations across more than 20 countries aimed at increasing delivery of awareness campaigns, public health infrastructure planning, and evidence-based services for autism.

Highlighted below are two international examples of public policy designed to improve health outcomes for individuals with autism.

### Case study:

### The UK's national strategy for children, young people and adults with autism

The UK has set out a national strategy for individuals with autism from 2021 to 2026.<sup>23</sup> The strategy emphasises the role of public policy in directly influencing the health outcomes of autistic individuals through structured interventions and system-level changes. This includes the implementation of national strategies and action plans, designed to integrate the needs of people with autism into broader health and social care frameworks.

1.

### The NHS Long Term Plan:

This strategy aims to improve health and life expectancy among people with learning disabilities and autism. It includes specific actions like piloting health checks for autistic people, expanding programmes to stop overmedication, and continuing funding for the Learning from Life and Death Reviews Programme (LeDeR), which aims at reducing health inequalities and preventing early deaths among autistic individuals. The plan also includes awareness and training initiatives for NHS staff, together with the implementation of a digital flag in patient records to highlight those with autism. These measures aim to ensure that autistic patients receive appropriate and considerate care in health settings.

2

### Legal and Regulatory Frameworks:

The Health and Care Act 2022 introduced mandatory training on autism and learning disabilities for all health and social care staff. This training, known as Oliver McGowan Training, is named after an autistic teenager who died in NHS care, highlighting the significance of improving care standards for autistic individuals.

3

#### **Education and Autism:**

Under the *Children and Families Act 2014*, local authorities are mandated to identify the health needs of the population within their jurisdiction and procure services aimed at aiding children and young individuals with special educational needs and disabilities (SEND). Educational institutions, excluding those in higher education, are mandated to comply with the 2015 SEND code of practice.



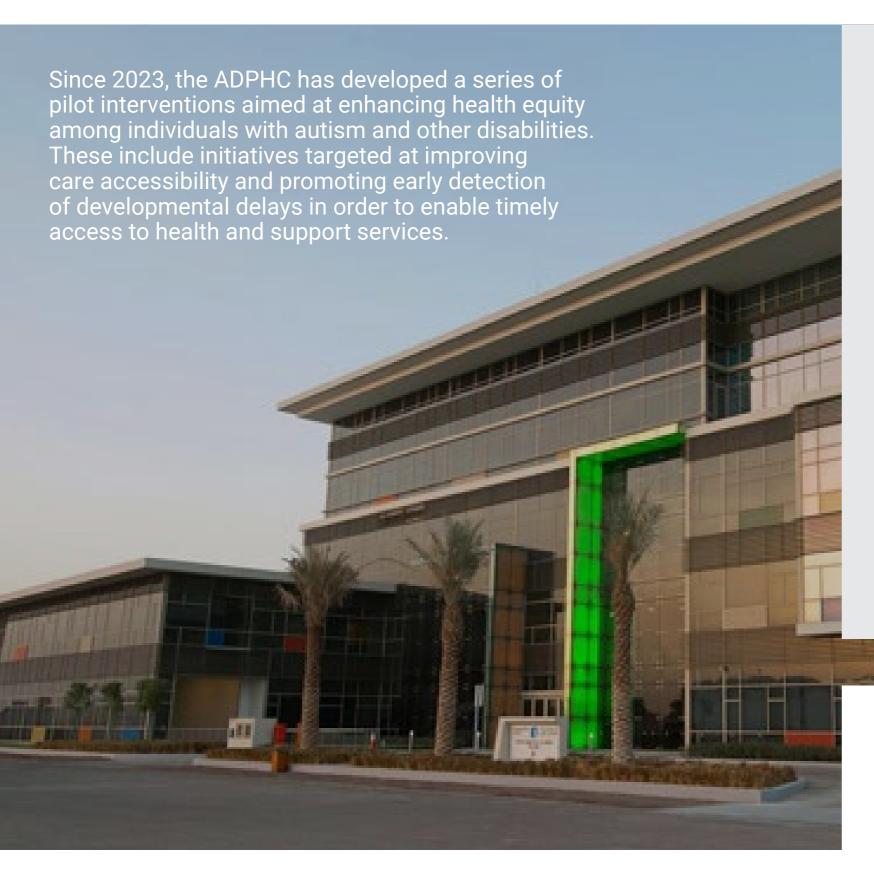








Public Policy: Catalysing Improved Health Equity in Autism Care



### Case study:

### Abu Dhabi Public Health Center (ADPHC) initiatives for People of Determination

1.

#### **Remote Care Platform:**

Individuals affected by disabilities, referred to in the UAE as People of Determination (POD), are recognised to face higher barriers accessing care than the general population, as well as having diseases and health conditions that require continuous management. As a result, healthcare providers in Abu Dhabi who are licensed to provide telehealth services are encouraged to utilise their digital platforms to target POD and their caregivers to organise remote consultations with doctors via voice or video call, contact health practitioners via text or WhatsApp, access e-prescriptions delivered to their home, and seek online referrals for healthcare and rehabilitation services when required. This aims to reduce the burden of care and enhance care coordination and integration for individuals with autism and other disabilities.

2.

### Early Detection of Developmental Delays:

The American Academy of Pediatrics recommends developmental testing for children at ages 9-, 18-, and 30-months with specific checks for autism performed at 18 months and 24 months. The ADPHC is developing a practice framework intended to become the standard of care for early detection of development delays in Abu Dhabi. It will provide healthcare practitioners with access to international evidencebased materials and validated screening instruments for early childhood, along with growth charts and development milestones tailored to autism and other conditions. Childhood wellbeing screening tools currently being piloted across schools and facilities in Abu Dhabi include the Paediatric Symptom Checklist (PSC) and Ages and Stages Questionnaires (ASQ) respectively. The initiative aims to improve quality of life and health for children with autism and other cognitive, emotional, and behavioural disorders by facilitating early intervention.

These examples emphasise the crucial role of public policy in addressing these factors and enhancing health equity within the population. In the following section, we introduce technology as a "super social determinant of health", and a key focal point for future policy development.











### Technology as an Enabler for Improving Health Equity for Individuals with Autism

3.1 TECHNOLOGY AS THE SUPER SOCIAL DETERMINANT OF HEALTH The first section of the paper outlined the SDOH and introduced technology as the "super social determinant of health", illustrating how digital access and literacy influence all other SDOH and thereby indirectly impact individuals' health outcomes.<sup>24</sup>

A recent report, Digital Inclusion as a Social Determinant of Health, highlights this relationship, providing the example of how "applications for employment, housing, and other assistance programmes, each of which influences an individual's health, are increasingly, and sometimes exclusively, accessible online."<sup>25</sup> This is reiterated within the Sustainable Development Goal (SDG) Indicator 4.4.2, which focuses on imparting relevant skills including digital literacy for employment and entrepreneurship, making clear that digital literacy is not just beneficial but essential to maintaining a high quality of life.<sup>26</sup>

However, the majority of the autistic population reside in low and middle-income countries, where access to electricity, internet, and the latest innovative technologies is often severely restricted, posing significant barriers to achieving the same level of digital literacy as the rest of the global population.<sup>27</sup> Sensory sensitivities, fine motor skill difficulties, communication struggles, sensory overload, attention problems, and differences in visual processing, can all further limit the digital literacy of individuals with autism. With technology being the "super social determinant of health", this has in turn a significant detrimental impact upon health outcomes. Developing policies to enhance digital literacy skills and increase access to inclusive technologies is therefore instrumental in addressing the health inequities faced by individuals with autism.<sup>28</sup>



3.2 INNOVATIVE
TECHNOLOGIES FOR
INDIVIDUALS WITH
AUTISM

Once addressing barriers to digital literacy, we can start to view technology as an enabler rather than a barrier to health equity. For the autistic population, digital innovations can offer a compelling avenue to enhance social and economic integration, in turn facilitating access to quality care.<sup>29 30</sup>

#### These technologies may broadly be categorised as:

End-user facing tools designed for individuals with autism

Data management platforms for use by carers and health providers

20









Technology as an Enabler for Improving Health Equity for Individuals with Autism

### **End User Facing Technologies**

### Artificial Intelligence (AI)

Al-driven innovations such as wearable smart glasses and interactive robots are improving communication, social interaction, and educational engagement for individuals with autism. These technologies adapt in real-time to the user's behaviour and responses, enabling tailored support that meets the unique needs of each individual. The integration of Al facilitates a deeper understanding of autism's complexities and encourages more inclusive therapeutic and educational environments.<sup>31</sup>

### Case study:

### Enara

Dubai-based Enara is an Al-driven early intervention platform that supports children with learning challenges, including autism, ADHD, and Down's syndrome, to master critical learning skills and lead a fulfilling and independent life.<sup>32</sup> The platform utilises advanced AI technologies to create personalised learning paths that adapt to the unique needs of each child, promoting skill development at their own pace.

### Case study:

### Inclusivity in Al

A key consideration for the development of Al-powered tools should be their inclusivity from a linguistic and cultural perspective, which can otherwise pose an additional barrier to access for individuals with autism. A relevant example is the Jais project by G42, developed in partnership with Mohamed bin Zayed University of Artificial Intelligence and Cerebras Systems, which introduces an advanced Arabic Large Language Model tailored to handle the unique linguistic features and cultural nuances of the Arabic language. This model, named after UAE's highest peak, significantly enhances digital inclusivity for over 400 million Arabic speakers and presents a unique opportunity to develop Al-powered support solutions for individuals with autism that surmount existing language barriers.<sup>33</sup>

### **Virtual Reality**

Recent studies have demonstrated the effectiveness of Virtual Reality (VR) therapies in clinical settings, where they are used to simulate social scenarios for individuals with autism. This approach supports the development of coping strategies within a controlled and repeatable environment, providing significant therapeutic benefits.<sup>34</sup> Development of coping strategies can empower individuals with autism to better navigate health facilities and systems, and thereby facilitate their ongoing access to care.

### **Shared Active Surfaces (SAS)**

SAS technologies refer to interactive surfaces equipped with sensors and displays that respond to user input, allowing for collaborative interaction and engagement. These surfaces can be deployed in workplaces and educational environments to enhance interpersonal engagement, and have been shown to be a highly effective means of facilitating collaborative interactions among children with autism.<sup>35</sup>











Technology as an Enabler for Improving Health Equity for Individuals with Autism

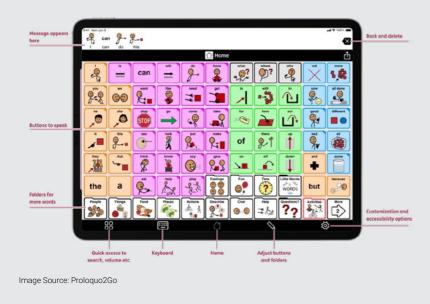
# Augmentative and Alternative Communication (AAC)

Hand-held technologies such as tablet devices and mobile phones can be used to facilitate AAC, which are strategies and tools intended to support or replace spoken language for individuals with communication difficulties. Examples include, signs, symbols, pictures, electronic devices, or software applications, providing autistic individuals with alternative means through which to express themselves. Studies on the application of AAC in practice have demonstrated its effectiveness in expanding communication for individuals with autism.<sup>36</sup>

### Case study:

### Proloquo2Go

Proloquo2Go<sup>37</sup> is an AAC application designed for individuals with autism and other communication difficulties. It provides a customisable grid-based communication system that allows users to express themselves using symbols, pictures, and text. Users can create personal communication boards tailored to their individual needs and preferences, including commonly used phrases, vocabulary, and specific topics or activities. Proloquo2Go also supports bilingual use, ensuring that language is not a barrier to receiving adequate care and support.



### Case study:

#### Avaz

Avaz AAC, including Avaz Freespeech and Avaz Reader<sup>38</sup>, is a picture and text-based platform that empowers non-speaking individuals with a clear means of communication. For those with autism, who may also experience co-occurring neurodevelopmental disorders, being understood is vital for their mental health and wellbeing. This tool not only facilitates daily communication but can also be used to articulate health symptoms, needs, and responses to treatment, which are crucial for equitable healthcare.



Image Source: AVAZ

 $^{24}$  —  $^{25}$ 









Technology as an Enabler for Improving Health Equity for Individuals with Autism

### **Data Management Tools**

### **Data Platforms**

Digital health platforms and tools can address the gaps in healthcare access and quality. For example, using algorithmic analyses of health records to speed up diagnosis and connect patients with appropriate providers has shown potential in reducing the time to diagnose complex conditions, which is often a challenge for those with autism who may have atypical clinical presentations.<sup>39</sup>

### Health Monitoring and Management

Health management applications for individuals with autism can enhance care quality by offering personalised support, communication aids, and behaviour tracking features. These applications also facilitate collaboration among caregivers, track health metrics, and promote holistic care coordination.

### Case study:

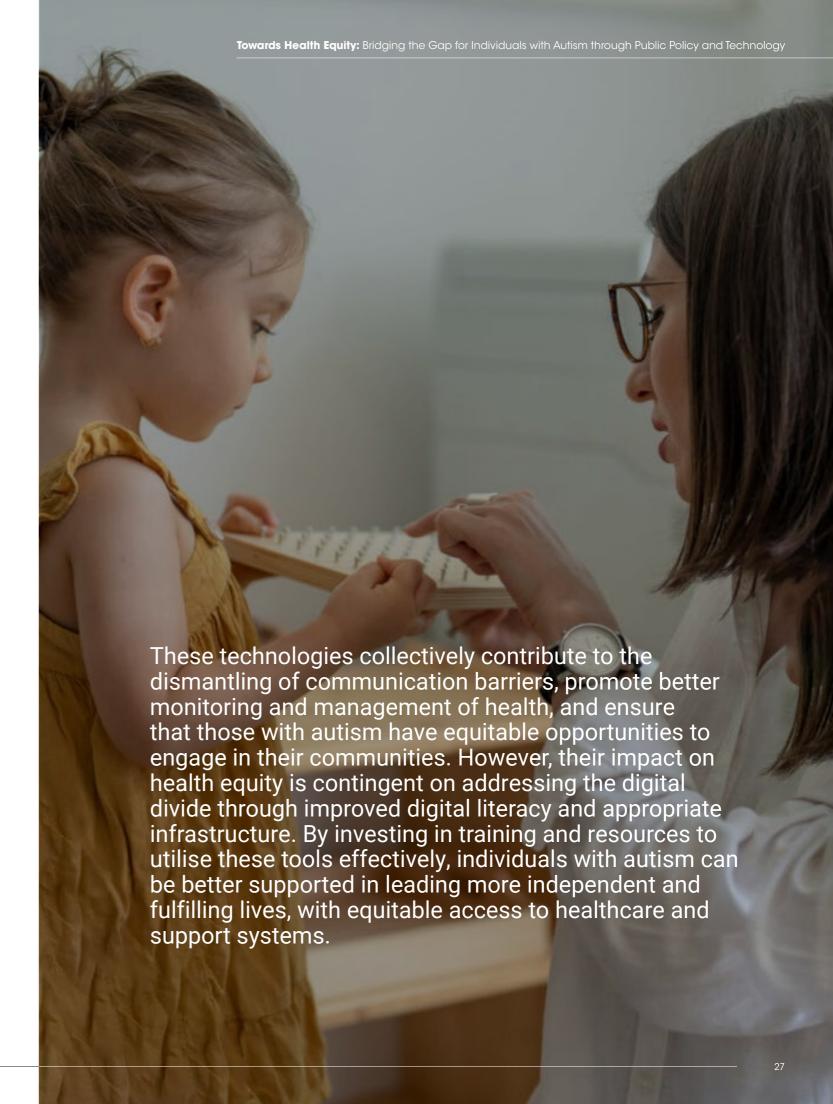
### Hi Rasmus

Hi Rasmus is a web-based collaborative e-platform for therapists and parents, providing data collection and graphing features that help monitor the child's development. 40 By aiding teachers, therapists, and parents in collaborative care, it ensures that the management of autism is consistent and informed, which is a cornerstone of health equity. This consistency can lead to better personalised care plans and therapies, which can improve health outcomes for individuals with autism.





Image Source: Hi Rasmus











### Actionable Public Policy Strategies for Technological Integration

Effective integration of technology in healthcare is crucial for addressing the unique needs of individuals with autism and enhancing their access to quality care. Governments around the world need to take action through policy initiatives which facilitate technological integration into autism care, finding solutions to overcome the potential barriers to implementation. We recommend that the following policies and measures are adopted in order to further promote health equity.



### 4.1 RECOMMENDATIONS AND DESIRED OUTCOMES FOR PUBLIC POLICY DEVELOPMENT

No	Recommendation	Action	Desired Outcome
1.	Promote Localisation and Cultural Adaptation	Implement a policy requiring all autism- related technology solutions to incorporate local languages and cultural nuances	Ensures higher user engagement and technology adoption across diverse populations by making these tools culturally relevant and linguistically accessible
2.	Create Regulatory Frameworks for Technology in Autism Care	Develop stringent guidelines that enforce safety, efficiency and ethical use of autism care technologies, including clear standards for data privacy and user content	Builds public trust and facilitates wider adoption by ensuring these technologies are safe and ethical
3.	Leverage Data-Driven Insights for Policy and Innovation	Establish a mandatory data-sharing framework that connects healthcare, educational and social services to inform policy-making and encourage innovation in autism care	Enhances service delivery and policy effectiveness via informed, data-driven decisions, improving outcomes for individuals with autism
4.	Establish User- Centric Innovation Hubs for Autism Care Technologies	Create innovation labs that include individuals with autism in the technology design and testing phases to ensure developments meet their real world needs	Leads to the creation of more practical assistive technologies (AT) that genuinely reflect the needs of those with autism, improving their social inclusion and independence
5.	Incentive Adoption and Integration	Provide tax credits, subsidies and recognition for organisations that effectively implement and scale assistive technologies for autism	Accelerates widespread adoption and integration of effective technologies enhancing autonomy and participation of individuals with autism in society
6.	Foster Public-Private Partnerships	Encourage joint ventures between the public sector, private industry and academic institutions to drive technological advancements and applications in autism care	Combines multi-sectoral expertise and resources to create innovative and practical solutions that can be widely accessed
7.	Establish Dedicated Technology Integration Funds	Allocate specific government funds to support the development and deployment of targeted autism care technologies	Stimulates innovation and broadens access to cutting-edge solutions that can transform care practices and patient outcomes
8.	Enhance Digital Literacy and Provide Tailored Technology Training	Launch comprehensive digital literacy and technology training programmes specifically tailored for individuals with autism	Empowers individuals with autism with the skills needed to effectively use digital tools, enhancing their independence and social participation
9.	Implement Training and Capacity Building Programmes	Mandate ongoing training for healthcare providers and educators on the latest autism care technologies and their application	Ensures that caregivers and service providers are well-equipped to support individuals with autism using the latest technologies
10.	Establish a Research and Data Sharing Platform for Autism and Learning Disabilities	Collaborate with global authorities to develop a platform for sharing data, experiences and insights from across the world that can foster research and development regarding autism and other developmental disorders	Facilitates increased innovation and ongoing learning about autism by providing a strong foundation for research and knowledge sharing





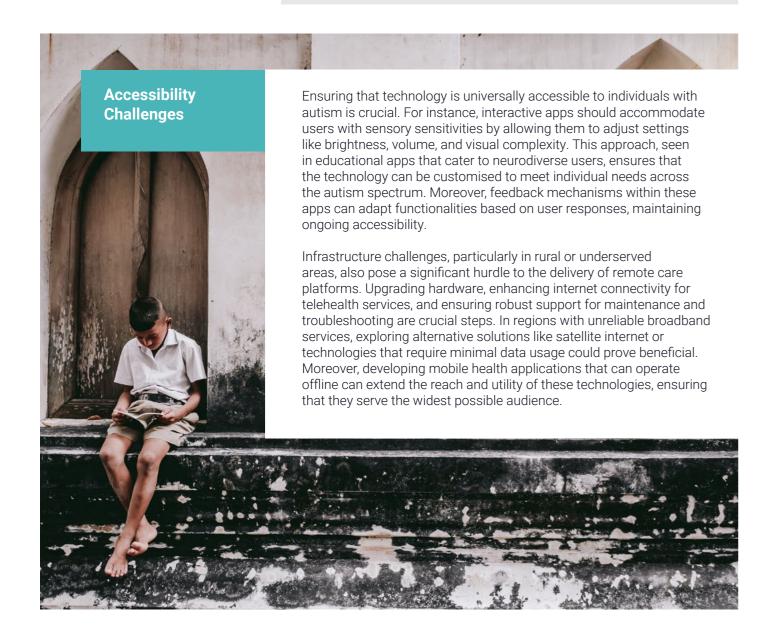




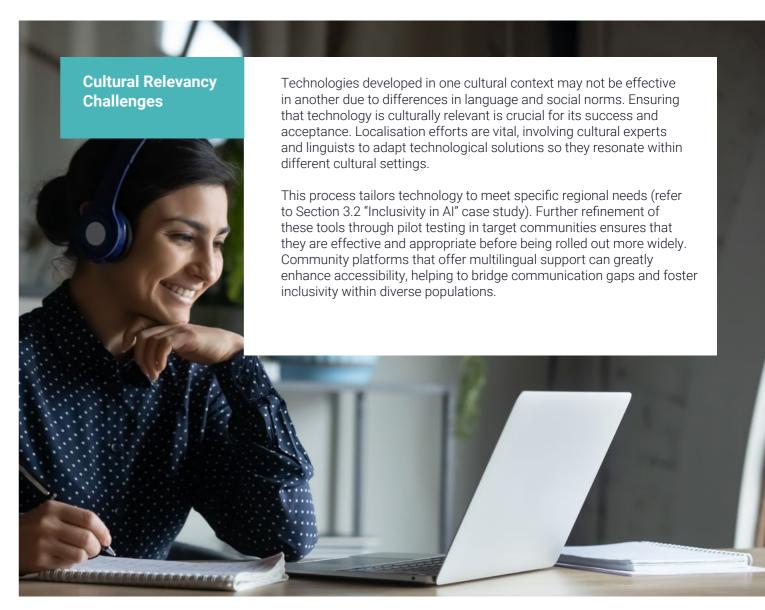
Actionable Public Policy Strategies for Technological Integration

4.2 ADDRESSING
CHALLENGES AND
CONSIDERATIONS

Successfully integrating technology into autism care requires addressing several critical challenges. These considerations ensure that the technological solutions developed are not only effective but also accessible, affordable, culturally relevant, and capable of overcoming practical implementation barriers.







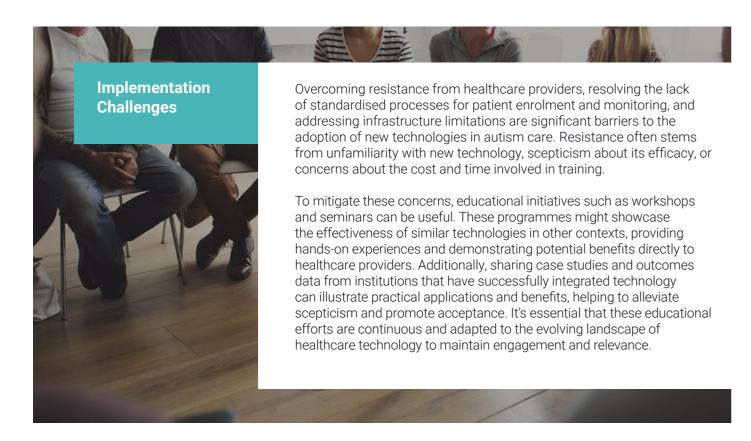








Actionable Public Policy Strategies for Technological Integration





### Conclusion

### **The Way Forward**

### **Towards Inclusive Health Equity**

The pursuit of health equity for individuals with autism requires a synchronised effort across the domains of public policy, technology, and community engagement. While significant strides have been made globally in recognising and addressing the unique needs of the autistic population, persistent gaps remain, particularly in the integration and practical application of policies and technologies.

This paper underscores the necessity for policies that not only recognise the unique challenges faced by individuals with autism, but also initiatives to actively integrate solutions that address these challenges through innovative technologies and comprehensive support frameworks.

Public policies must be adaptable and inclusive, ensuring that technological advancements are accessible to all, irrespective of socioeconomic or geographical barriers. Furthermore, improving understanding and awareness of the benefits of autism-related programmes is essential. A key enabler supporting this will include the development and roll-out of awareness, communication and media plans, alongside relevant partnerships and providers to educate global communities.

The digital transformation of healthcare and social services presents a valuable opportunity to improve not only the accessibility and quality of services provided to individuals with autism, but also their overall participation in society. It is essential that these technological solutions are developed and implemented with direct input from the autistic community to ensure they meet actual needs and preferences.

Achieving health equity for individuals with autism is not merely a policy or technological issue but a broader societal commitment. It demands a collective push towards inclusive, informed, and compassionate practices that recognise the value and potential of every individual, regardless of their neurological makeup. By fostering an environment that embraces this diversity, we may bridge gaps in the social determinants of health and enhance equity across the population.









## Notes and References Index

- 1. Zeidan J et al. | March 2022Autism spectrum disorders. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders
- 2. Lai, M. C., Lombardo, M. V., & Baron-Cohen, S.. (2020, March). Autism. Lancet, 395(10242), 1541-1550. Elsevier. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7082249/.
- 3. No author listed. (2020, November 2). Adults living with autism spectrum disorder. Centers for Disease Control and Prevention. https://www.cdc.gov/ncbddd/autism/features/adults-living-with-autism-spectrum-disorder.html.
- 4. No author listed. (n.d.). Health equity. World Health Organization. https://www.who.int/health-topics/health-equity#tab=tab\_1.
- 5. No author listed. (n.d.). Social determinants of health: Addressing social determinants of health is a primary approach to achieving health equity. Centers for Disease Control and Prevention. https://www.cdc.gov/nchhstp/socialdeterminants/faq.html.
- 6. No author listed. (n.d.). Health equity. World Health Organization. https://www.who.int/health-topics/health-equity#tab=tab 1.
- 7. No author listed. (n.d.). Medical conditions associated with autism. Autism Speaks. https://www.autismspeaks.org/medical-conditions-associated-autism
- 8. Fletcher-Watson, S. & Happé, F. (2016, March 15). Autistica's report: A lifelong perspective. BMJ, 352:i1615. BMJ. https://www.bmj.com/content/352/bmj.i1615.
- 9. No author listed. (2019). Building Happier, Healthier, Longer Lives: The Autistica Action Briefings 2019. Autistica. https://www.autistica.org.uk/downloads/files/Building-Happier-Healthier-Longer-Lives-The-Autistica-Action-Briefings-2019.pdf.
- 10. No author listed. (n.d.). Social determinants of health: Addressing social determinants of health is a primary approach to achieving health equity. Centers for Disease Control and Prevention. https://www.cdc.gov/nchhstp/socialdeterminants/fag.html.
- 11. Chaste, P., Leboyer, M. (2022, April). Genetics of autism spectrum disorders: a review of genome-wide association studies. Frontiers in Psychiatry. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9314009/.
- 12. No author listed. (2023, July). NAIR Calls for Health-Care Policy Improvements for Future Public Health Emergencies. Drexel University. https://drexel.edu/news/archive/2023/July/NAIR-Calls-for-Health-Care-Policy-Improvements-for-Future-Public-Health-Emergencies.
- 13. Sandin, S., et al. (2020, April). The heritability of autism spectrum disorder. JAMA. https://pubmed.ncbi.nlm.nih.gov/33902706/.
- 14. Friedman, N., et al. (2023, February). Prioritizing Social Determinants of Health in Early Childhood. Pediatrics. https://publications.aap.org/pediatrics/article/151/2/e2022059541/190524/Prioritizing-Social-Determinants-of-Health-in?autologincheck=redirected.
- 15. Al-Ghadeer, H. et al. (2020). Autism in Saudi Arabia: a challenge to Saudi families. ResearchGate. https://www.researchgate.net/publication/343622319\_Autism\_in\_Saudi\_Arabia\_a\_challenge\_to\_Saudi\_families\_a\_cross-sectional\_study.
- 16 Friedman, N., et al. (2023, February). Prioritizing Social Determinants of Health in Early Childhood. Pediatrics. https://publications.aap.org/pediatrics/article/151/2/e2022059541/190524/Prioritizing-Social-Determinants-of-Health-in?autologincheck=redirected.
- 17. Hirvikoski, T., et al. (2022, February). Reduced ADHD symptoms in adults with ADHD after structured skills training group: results from a randomized controlled trial. JAMA Psychiatry. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8992913/.
- 18. Dubai Autism Center. (n.d.). Dubai Autism Center. https://www.dubaiautismcenter.ae/.
- 19. No author listed. (2021). Digital access as a super determinant of health. SAMHSA. https://www.samhsa.gov/blog/digital-access-super-determinant-health.

- 20. Sieck, C. J., Sheon, A., Ancker, J. S., Castek, J., Callahan, B., Siefer, A. (2021, March). Digital inclusion as a social determinant of health. NPJ Digital Medicine, 4(1):52. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7969595/.
- 21. No author listed. (2023, July). NAIR Calls for Health-Care Policy Improvements for Future Public Health Emergencies. Drexel University. https://drexel.edu/news/archive/2023/July/NAIR-Calls-for-Health-Care-Policy-Improvements-for-Future-Public-Health-Emergencies.
- 22. No author listed. (2021). Autism Research: Breakthroughs and Discoveries. Wiley Online Library. https://onlinelibrary.wilev.com/doi/10.1002/aur.1236.
- 23. No author listed. (2021). UK Government's Strategy on Autism. UK Parliament Research Briefings. https://researchbriefings.files.parliament.uk/documents/CBP-7172/CBP-7172.pdf.
- 24. No author listed. (2021). Digital access as a super determinant of health. SAMHSA. https://www.samhsa.gov/blog/digital-access-super-determinant-health.
- 25. Sieck, C. J., Sheon, A., Ancker, J. S., Castek, J., Callahan, B., Siefer, A. (2021, March). Digital inclusion as a social determinant of health. NPJ Digital Medicine, 4(1):52. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7969595/.
- 26. No author listed. (2018). Global Framework Reference on Digital Literacy Skills for Indicator 4.4.2. UNESCO. https://uis.unesco.org/sites/default/files/documents/ip51-qlobal-framework-reference-digital-literacy-skills-2018-en.pdf.
- 27. Khanlou, N., Khan, A., Vazquez, L.M., et al. (2021). Digital Literacy, Access to Technology and Inclusion for Young Adults with Developmental Disabilities. Journal of Developmental and Physical Disabilities, 33, 1-25. https://link.springer.com/article/10.1007/s10803-021-05084-8.
- 28. Sieck, C. J., Sheon, A., Ancker, J. S., Castek, J., Callahan, B., Siefer, A. (2021, March). Digital inclusion as a social determinant of health. NPJ Digital Medicine, 4(1):52. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7969595/.
- 29. Khanlou, N., Khan, A., Vazquez, L.M., et al. (2021). Digital Literacy, Access to Technology and Inclusion for Young Adults with Developmental Disabilities. Journal of Developmental and Physical Disabilities, 33, 1-25. https://link.springer.com/article/10.1007/s10882-020-09738-w.
- 30. Hume, K., Steinbrenner, J.R., Odom, S.L., et al. (2021). Evidence-Based Practices for Children, Youth, and Young Adults with Autism: Third Generation Review. Journal of Autism and Developmental Disorders, 51, 4013-4032. https://link.springer.com/article/10.1007/s10803-020-04844-2.
- 31. Iannone, A., Giansanti, D. (2024). Breaking Barriers—The Intersection of Al and Assistive Technology in Autism Care: A Narrative Review. Journal of Personalized Medicine, 14(1):41. https://doi.org/10.3390/jpm14010041.
- 32. No author listed. (n.d.). MyEnara. https://www.myenara.com/.
- 33. No author listed. (n.d.). Meet JAIS: World's Most Advanced Arabic LLM Open Sourced by G42's Inception. G42. multiple sources including https://www.q42.ai/resources/news/meet-jais-worlds-most-advanced-arabic-llm-open-sourced-q42s-inception.
- 34. Parsons, S., & Mitchell, P. (2002). The potential of virtual reality in social skills training for people with autistic spectrum disorders. Journal of Intellectual Disability Research.
- 35. Kumm, A.J., Viljoen, M. & de Vries, P.J. (2022). The Digital Divide in Technologies for Autism: Feasibility Considerations for Low- and Middle-Income Countries. Journal of Autism and Developmental Disorders, 52, 2300–2313. https://link.springer.com/article/10.1007/s10803-021-05084-8.
- 36. Pereira, et al. (2020). Augmentative and Alternative Communication on Autism Spectrum Disorder: Impacts on Communication. CoDAS, 32(6). https://www.scielo.br/i/codas/a/QxhXpZ3jckz6K3dyCdbVhXq/?format=pdf&lang=en.
- 37. No author listed. (n.d.). Top 3 Android Apps for Children with Autism. TechLoy. https://www.techloy.com/top-3-android-apps-for-children-with-autism/. Additional product details from AssistiveWare at https://www.assistiveware.com/products/proloquo2go.
- 38. No author listed. (n.d.). Avaz FreeSpeech. Avaz Inc. https://avazapp.com/products/avaz-freespeech/.
- 39. No author listed. (n.d.). Digital Health: An Opportunity to Advance Health Equity. McKinsey & Company. https://www.mckinsey.com/industries/life-sciences/our-insights/digital-health-an-opportunity-to-advance-health-equity.
- 40. No author listed. (n.d.). HiRasmus. https://hirasmus.com/.

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