# The Role of Digital Technologies in Aging and Health

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Pan American Health Organization
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Decade of healthy aging in the Americas
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situation and challenges

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# Contents

# Acknowledgments

This report was developed by the Healthy Life Course Unit of the Department of Family, Health Promotion and Life Course of the Pan American Health Organization (PAHO) with the collaboration of the International Telecommunication Union (ITU). It was drafted by Roxana Widmer-Iliescu, Cristina Bueti, Simão Campos Neto, Mythili Menon, and Chris Ip of ITU.

This publication is part of a series titled "The Decade of Healthy Aging in the Americas: Situation and Challenges", and is the result of an interagency effort, coordinated and edited by Patricia Morsch, Enrique Vega, and Pablo Villalobos, under the supervision of Luis Andrés de Francisco Serpa, from PAHO.

The purpose of the series is to provide continuous updates on the different areas of action of the Decade of Healthy Aging (2021–2030) in the Region, as well as on other related aspects. The collaboration of experts from PAHO, the United Nations and the Inter-American System, and the academic world who participated in the initiative and formulated essential feedback and recommendations for the project to see the light is appreciated.

# From vulnerable to valuable

According to the United Nations Department of Economic and Social Affairs *World Population Aging 2020 Highlights*, there were an estimated 727 million persons aged 65 years or older worldwide in 2020. This number is expected to more than double by 2050, reaching over 1.5 billion older people (*1*). The Americas can expect to follow a similar trend. In the case of the United States of America, it is estimated that the number of persons aged 65 or older will double over the next 40 years, reaching 80 million in 2040 (*2*). Latin America seems to be following a similar growth trajectory, with the proportion of older adults expected to represent more than a quarter of the entire population in the region by 2050 (*3*). The demand for greater care for older adults, including meeting their health needs and ensuring their quality of life, will continue to be the primary challenge for building a society that is inclusive of all age groups.

The International Telecommunication Union (ITU), in its dual role as the United Nations specialized agency on information and communication technologies (ICTs) and an international standards developing organization, has been working to support the integration of digital technologies in health and aging through standardization. ITU is fully committed to contributing to the success of the United Nations Decade on Healthy Aging by raising awareness, developing guidelines and policies along with providing strategic advice, sharing good practices, and strengthening the capacity of ITU members to leverage ICTs in delivering innovative solutions for socioeconomic benefit and, thereby, turning this challenge of population aging into an opportunity. To enable this, older populations represent a specific target group for the Digital Inclusion program developed by ITU (*4*).

Caring for older persons could be viewed as a burden by a certain portion of the younger population. As nuclear families become more common across the world, older individuals, especially in developing countries, often find themselves isolated and abandoned by their families. This harmful mindset and related misconceptions have not only built a barrier that discourages society from taking proactive actions to address the needs of older individuals but also overlooks the immense value that these people bring to society. Recognizing this, a recent report on *Ageing in a Digital World - from Vulnerable to Valuable* (*5*), published by ITU, highlighted that ICTs can play a fundamental role in enabling older persons to overcome age-related disabilities and give them the opportunity to have an independent and healthier life. This

will further empower older individuals to become active participants and functional contributors to their respective communities in the context of sharing valuable life skills, knowledge, and experiences with younger generations.

Through this report, ITU raises awareness on the need for policymakers and other stakeholders to be aware of the importance of ICT/digital accessibility and also have the core knowledge/skills to build universally designed and age-friendly environments, to further take advantage of the digital opportunities for facilitating economic, social, and political growth in their countries and regions.

Additionally, ICTs can enable older persons to continue living independently for a longer time (*6*). This would benefit society as a whole and help improve the mental health of individuals, while providing timely care and medical interventions at reduced costs.

In this context, it is important to mention that older persons are also strong drivers of socioeconomic development. In the United States of America, it is estimated that people over 50 account for 56% of every dollar spent in the United States in 2018, and is expected to represent 61% of total spending by 2050. (*7*). In Latin America and the Caribbean, people over the age of 60 will be the source of nearly 30% of all growth in consumption in cities (*8*).

Considering the ICTs, as also indicated in the ITU report, the aging population represents an attractive business opportunity not only for the technology industry but also for other sectors such as health care and lifelong learning. Moreover, the private sector can use this opportunity to service the needs of older persons to bring benefit to their respective businesses.

## Digital inclusion

Digital technologies have a fundamental role to play in unlocking the full potential of older persons. ICTs, if developed and delivered in accessible formats, could give everyone, including older persons, access to and use of digital information products and services. Additionally, ICTs, if designed and implemented to consider digital inclusion for everyone, can ensure the creation of digital environments in which everyone benefits and is empowered by technologies to contribute to society at large. In particular, *"age technology,"* namely all technological products and services designed with and for older persons, has the potential to help boost development and inclusion (*4*).

**Figure 1.** Digital inclusion pyramid


*Source:* International Telecommunication Union. Ageing in a digital world - from vulnerable to valuable. Geneva: ITU; 2021.

To foster the transition to such an environment, older persons will need to have the skills and knowledge to use digital technologies effectively. In the context of COVID-19, older persons who were connected to the Internet, had appropriate ICT devices, and were technologically literate were far better positioned to deal with the reality of sudden lockdowns, not only for their own health and welfare but also to keep in touch with family members and stay abreast of the latest information and health-based guidance notices. Such individuals were also able to overcome the general feeling of being isolated during periods of self-quarantine or lockdown (*9*).

However, without proper policy support, digital transformation could also increase the risks of digital exclusion, particularly among the older generation. Studies indicate that merely having access to a computer or the Internet does not equate with these being used. For example,

in Latin American countries such as Ecuador, El Salvador, Mexico, Paraguay, and Peru, the computer-use rate among older adults is lower than the proportion of older adults having access to a computer at home. Taking Ecuador as an example, in 2015, more than 30% of its older population had a computer at home but only around 24% of them were using it (*3*).

Therefore, to ensure that the process of digital transformation is inclusive for all people regardless of their age, gender, ability, or location, three fundamental "A" pillars should be considered: Access to ensure connectivity; Affordability of the Internet and the devices; and Accessibility, which is enabled through Adoption of policies, development of Accessible ICTs—devices, products, and services—as well as the Appropriation of technology, to ensure that all population groups having access to ICTs can have meaningful participation within the digital economy (see Figure 1).

Moreover, increased digital inclusion and accessibility of ICTs will contribute directly to the achievement of the United Nations Sustainable Development Goals (SDGs), including SDG 3, Good health and well-being; SDG 8, Decent work and economic growth; SDG 10, Reduced inequalities; and SDG 11, Sustainable cities and communities.

## ICTs can improve the lives of older persons, today and tomorrow

> "ICTs have a fundamental role in creating environments that are suitable to promote healthy conditions and tackle the challenges that come with aging by empowering older generations. ICTs can become enablers for the social inclusion of older persons, if products and services are designed while taking into consideration their needs and requirements." (Foreword, ITU report *Ageing in a Digital World - from Vulnerable to Valuable*) (*5*).
>
> **– Doreen Bogdan-Martin, Secretary-General, ITU**

The two global mega trends linked to an aging population and the exponential rise in digital technologies are underpinned in the *Digital Inclusion* work of ITU, which focuses on achieving healthier, wealthier, and inclusive digital societies globally, in line with the United Nations Decade on Healthy Aging initiative. By encouraging technology

transfer, raising awareness, developing guidelines on policies and strategies, sharing good practices, and strengthening capacity of ITU members to formulate ICT-based innovative solutions, ITU equips relevant stakeholders to turn the challenge of an aging population into an opportunity to establish an inclusive community. A primer for activities in this domain includes the guidelines, best practices, and solutions shared in the ITU report Ageing in a Digital World - from Vulnerable to Valuable (*5*).

## **Creating digital inclusive and age-friendly environments** – further guidance

Facilitating the inclusion of older persons by leveraging digital technologies is increasingly becoming a point of focus for policymakers, decisionmakers, and stakeholders who aim to support the transition to an inclusive and age-friendly digital ecosystem.

To provide further guidance within this domain, ITU has developed a free online course on "ICTs for Better Ageing and Livelihood in the Digital Landscape," which consists of three modules encapsulating the various challenges, key terminology, elements, accessibility requirements, and concepts related to digital inclusion for older persons, along with the standards and policy recommendations to enhance the quality of life of aging populations around the globe.

This online course, available on ITU Academy, was created for the benefit of ITU Member States, policymakers, decisionmakers, and other interested stakeholders to impart pertinent knowledge on the topic and along with the relevant tools and resources to be able to construct healthier and wealthier inclusive digital societies at the local, national, and regional levels (*4*).

Digital transformation is fundamentally reshaping the care of older persons in all its aspects. Artificial intelligence (AI) improves home monitoring for older persons by continuously monitoring irregular activities or patterns related to health issues; for example, in terms of fall prevention, which accounts for more than 50% of hospitalizations due to lesions in people older than 65 (*10*). AI-based devices are providing voice-based assistance to remind older persons of their medication schedule. Smart wearables powered by AI are also providing a convenient means with which to monitor and detect inconsistencies in biometric data and sound an alarm in case of falling or home intrusion (*11*). In addition, machine learning enables AI-based monitoring systems to carry out predictive analytics to assess risk levels, make recommendations based on real-time data, and subsequently facilitate timely medical care (*12*).

Virtual reality (VR) is also being used to improve the mental health of older persons and tackle isolation. VR enables older persons to visit their favorite locations and travel to places where they used to live simply by putting on a VR headset. The feeling of loneliness and

isolation has profound impacts on the mental health of older citizens. VR can create a new virtual space, or even recreate a memory of the past, where older adults can be joined by family members and friends to socialize and engage in activities that they may no longer be able to engage in because of the aging process. Additionally, VR can provide a unique brain-stimulating experience that encourages older adults to stay mentally active. Through VR, older persons can play games that require them to move around or perform simple exercises that would keep them mentally active, with positive impacts on their quality of life (*13*).

## Integrating digital technologies using international standards

> "Standards are crucial for unlocking the full potential of digital health and improving the care of aging populations. E-health applications, telemedicine, wearable devices, and other multimedia systems need to be supported by a vibrant interoperable Internet of Things (IoT) ecosystem to maximize their benefits. The use of standards is the most effective way to enable interoperability."
> **– Seizo Onoe, Director, Telecommunication Standardization Bureau, ITU**

Digital transformation has been playing a significant role in enhancing the healthcare industry for years. For the industry to keep innovating and adopting new technologies, health data need to be easily transmittable within the IoT systems. A similar logic applies when it comes to integrating digital technologies to support the aging process and improve the health of older persons. The smart wearables that older citizens are wearing need not only to be capable of collecting data from different sensors/devices but also of communicating with different platforms and systems. In this context, international standards are the key component for setting the interoperability and architecture requirements of IoT for digital health.

It is an undeniable truth that the global community can play a central role in facilitating digital transformation on a global scale. ITU has been developing standards and guidelines on telecommunication/ICT accessibility for persons with disabilities, for human factors, for e-health, and for e-services.

Through collaboration with the World Health Organization (WHO) and other standards developing organizations, ITU is also working on e-health standardization in areas such as safe listening, brain informatics, ultra-high-definition medical imaging, and personal connected health. The ITU/WHO Focus Group on Artificial Intelligence for Health (FG-AI4H) was established in 2018 by the ITU-T Study Group 16 on Multimedia and Related Digital Technologies. In line with its scope, FG-AI4H is working to establish a standardized assessment framework for fostering AI-based methods for diagnosis and treatment. One of the Topic Groups within FG-AI4H is also dedicated to the standardized benchmarking of AI solutions to prevent falls among older people and provide quick interventions in case such situations arise.

WHO has also partnered with ITU to bring together governments, health professionals, academia, and the industry to discuss the role of ICTs in helping to make listening safe. Expected outcomes include policy briefs, international standards, and awareness campaigns to ensure that people of all ages can enjoy music, games, movies, and live events without jeopardizing their hearing.

Social isolation and loneliness among older people are growing public health and public policy concerns that have been made more salient by the COVID-19 pandemic. The advocacy brief *Social Isolation and Loneliness among Older People* (*14*), published under the leadership of WHO, ITU, United Nations Department of Economic and Social Affairs, and UN Women at the end of July 2021, recognizes the importance of developing appropriate policies and strategies globally.

The advocacy brief indicates that 20%–34% of older individuals in China, Europe, Latin America, and the United States of America are lonely. Social isolation and loneliness are harmful and shorten older people's longevity and negatively impact their mental and physical health and quality of life.

However, the advocacy brief acknowledges the beneficial role of ICT in reducing social isolation and loneliness "– Through … digital interventions such as cognitive behavior therapy, social skills training and befriending; – By improving infrastructure (e.g., transport, digital inclusion, built environment) and promoting age-friendly communities; – Through laws and policies to address, for instance, ageism, inequality, and the digital divide" (*14*).

ITU also leads the development of technical standards for devices (such as mobile phones) and has approved several standards including the

ITU-T H.870 series focused on safe listening. When implemented, these standards will enable the control of exposure to loud sounds through personal audio systems and will provide information that enables users to make safe listening choices (*15*).

Motivated by the social distancing during the COVID-19 pandemic and the existing barriers to technology use by persons with disabilities and specific needs, including older persons, ITU and WHO continue their collaboration on standards development, to make telehealth services and systems accessible through Recommendation F.780.2 – Accessibility of Telehealth Services, a joint ITU and WHO global standard (*16*).

Existing ITU standards have provided authentic guidance for facilitating e-health monitoring (EHM) services, including Recommendation ITU-T Y.4110 – Service and Capability Requirements for e-Health Monitoring Services (*17*) and Recommendation ITU-T Y. 4408 – Capability Framework for e-Health Monitoring Services (*18*). They provide important guidance for setting the capability requirements and the IoT framework for EHM services. EHM services exploit the identification, data capture, data processing, and communication capabilities of the IoT to monitor customers' health, while maintaining the required privacy. This concept can be applied to the use of digital technologies in older person care, where AI and other IoT applications are being deployed to monitor seniors' health. In essence, these standards define the IoT network and capability requirements that support EHM services.

ITU standards, such as Recommendation ITU-T Y.4117 – Requirements and Capabilities of the Internet of Things for Support of Wearable Devices and Related Services (*19*), developed by ITU-T Study Group 20 on IoT, Smart Cities and Communities have also described the IoT requirements for wearable device-related services, including the smartwatches and VR headsets that are utilized for older person care (*20*).

# A call for intensified collaboration

> "In a world that is aging rapidly, I would like to reaffirm ITU's commitment to work together to bringing older persons online and empower them to make use of digital technologies so that they can take their rightful place in the global community."
>
> **– Seizo Onoe, Director, Telecommunication Standardization Bureau, ITU**

Tackling the challenges associated with aging populations will continue to require innovative and inclusive approaches to encourage and incentivize the industry and governments to provide for everyone. ITU's collective efforts must have one thing in common: collaboration! We must work together to bring everyone online, regardless of age, gender, education, ability, location, or financial means.

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*The Role of Digital Technologies in Aging and Health* is part of the publication series titled "The Decade of Healthy Aging in the Americas: Situation and Challenges." The publications are designed to present updated information and data on aging and health, to favor prioritization of effective actions at the local level as well as monitoring and development of public health policies, for the implementation of the United Nations Decade of Healthy Aging (2021–2030) in the Americas. This document presents the opportunities that arise when technology is designed and presented as a tool for aging and how it can improve the lives of older persons. It emphasizes the need to develop innovative and inclusive approaches to encourage the industry and governments to provide technological solutions suitable for older people and everyone.

The Decade of Healthy Aging 2021–2030 is a period to guide action toward the transformation of societies to the aging of populations and fostering the inclusion of older people in every decision. This document intends to contribute to this strategy and highlight the upcoming challenges and opportunities around healthy aging through technology use.

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