



# How to stay connected and productive in an aging world.

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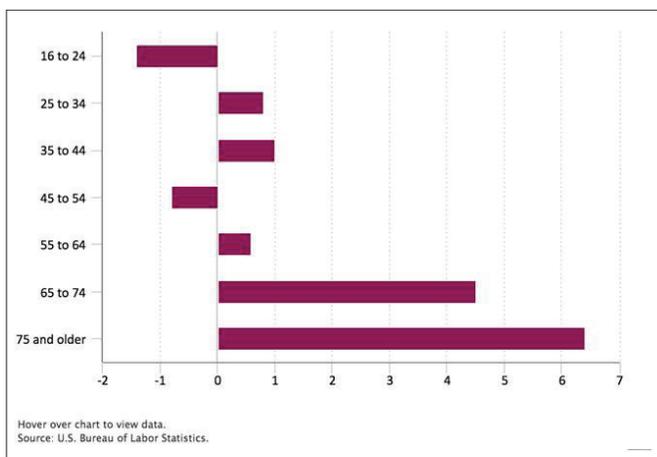
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## In pursuit of healthy aging

People are living longer. According to the World Health Organization (WHO), the proportion of the world's population older than 60 years of age will nearly double from 12% to 22% by 2050<sup>1</sup>. One challenge that accompanies this demographic shift is the need for older people to remain employed longer so they can financially support themselves during their extended lifetime period. This challenge poses an immediate problem because baby boomers (adults born between 1946 and 1964) are still in the labor force, and the oldest among them are planning on staying in the labor force as long as they need to. To put this into perspective, by 2024, baby boomers will have reached ages 60 to 78. And according to a recent Pew Research Center analysis of official labor force data, in 2018, 29% of boomers ages 65 to 72 were working or looking for work<sup>2</sup>. Perhaps surprisingly, the age group 65 years and older are projected to have faster rates of labor force growth annually than any other age group (Figure 1), with most of these workers holding management and professional positions.

Another challenge is the increasing need for older people to remain connected within their social circles for support (e.g., family, friends, colleagues) because financial, social, and mental health is dependent on healthy connections/relationships. It is common knowledge that good relationships keep us happier and healthier. To remain employed and socially connected, however, assumes some level of physical and mental capacity (e.g., hearing, seeing and mobility). Yet, the time at which older people become increasingly reliant on physical and mental capacities to compensate for changes in their environment is the same time at which our physical and mental capacities decline because of advancing age. Maintaining employment, for example, is dependent on being able to keep up relevant skillsets while also being able to effectively communicate with colleagues and leadership within a rapidly changing employment setting. Reaching out to friends or family for emotional support, or to help coordinate visits to a doctor's office, is also dependent on the ability to communicate one's needs. Both of these scenarios are dependent on having the physical and mental capacities required to communicate. Further complicating the situation, the means by which we communicate in our place of employment and within our community are becoming increasingly complex and heavily dependent on technology. Operating a smart phone, banking online and responding to electronic mail have all become required functions when participating in modern-day society. All of these demands put older adults at a disadvantage because baby boomers and even early generation X'ers (1965 - 1980) have not grown up with technology. For this reason, older people often describe themselves as being uncomfortable and less tech savvy than younger generations. Approximately 77% of older Americans report needing someone to assist them in the process of learning new technologies<sup>3</sup>.



*Figure 1. Annual growth rate in labor force by age, projected 2014-2024 (percent).*

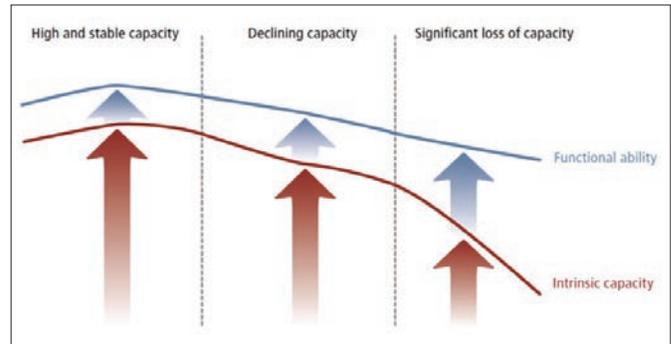
Part of the reason older adults experience difficulty using new tools relates to physical/health limitations. By age 60, for example, the major burdens of disability and death arise from age-related losses in hearing, seeing and moving, and noncommunicable diseases, including heart disease, stroke, chronic respiratory disorders, cancer and dementia<sup>4</sup>. According to a Pew Research study, 23% percent of older adults indicated having a “physical or health condition that made reading difficult or challenging.”<sup>5</sup> Also, nearly 25% of those aged 65 to 74 and 50% of those who are 75 and older have disabling hearing loss<sup>6</sup>. Because impairments often appear at the same time, multimorbidities exist and negatively affect a person’s quality of life.

### Optimizing the functional ability of older people

The decline of a person’s physical and/or mental condition (e.g., loss in hearing, seeing and moving, etc.) is described by the WHO as a decline in a person’s “intrinsic capacity”<sup>7</sup> (Figure 2). A person’s intrinsic capacity is the composite of all the physical and mental capacities of the individual. As a person’s (IC) declines, so does his or her ability to use those capacities to: carry out daily activities of living, build and maintain relationships, maintain employment and stay socially connected. In this respect, a decline in a person’s intrinsic capacity can be said to also negatively affect one’s functional ability; defined as, the ability to be and to do what we value<sup>7</sup>. For example, a decline in a person’s intrinsic capacity (hearing, seeing or moving) might limit our ability to partake in meaningful community events, garden or work outside, communicate with loved ones, dine socially, or maintain employment.

A primary goal of the WHO World Report on Ageing and Health, therefore, is to promote Healthy Ageing by preventing further physical and mental decline while helping people develop and maintain functional abilities. To accomplish this goal, the Department of Ageing and Life Course within the WHO developed guidelines for the Integrated Care of Older People (ICOPE)<sup>8</sup>. Their recommendations offer evidence-based guidance for health care providers, support caregivers and other community-based stakeholders on the topics of: mobility, nutrition or vitality, vision, hearing, cognition and mood, as well as urinary incontinence and risk of falls (ICOPE).

The focus of this white paper is vision and hearing loss. Specifically, how to achieve greater functional ability in the face of reduced vision and hearing capacity, so older people can remain socially connected and productive.



*Figure 2. Intrinsic capacity and functional ability do not remain constant but decline with age as a result of underlying diseases and the ageing process. (WHO, 2017) Integrated care for older people Guidelines on community-level interventions to manage declines in intrinsic capacity.*

### Why are vision and hearing care health priorities?

According to the Global Burden of Disease project, sensory impairment is the most common cause of years of healthy life lost from disability among people 60 years of age and older<sup>9</sup>. This is particularly true in low and lower-middle income countries where access to hearing and vision care may not be available or affordable. When left untreated, reduced vision and hearing capacities can result in social withdrawal, isolation, depression and even financial decline. An increased risk of cognitive decline has also been reported.<sup>10</sup>

Age-related declines in vision and hearing capacity occur within similar time windows, beginning in middle age and continuing into old age. Approximately 20% of adults 70 years of age and older experience dual sensory loss<sup>11</sup>. Because of this co-morbidity, integrated approaches to assessing and managing hearing and vision make sense. Take for example an older employee who no longer participates in boardroom discussions because he can't see what's being projected on the screen, and he can't hear what his colleague at the end of the table is saying. In this case, the provision of vision and hearing care has the potential to improve this person's ability to function in the workplace. The use of spectacles combined with hearing assistive technology, for example, could help this person remain active and engaged at work. And, if reduced sensory capacity had been identified earlier in the lifespan, declines in workplace functional ability might have been avoided altogether. For these reasons, the WHO ICOPE guidelines state:

- **VISION:** Older people should receive routine screening for visual impairment in the primary care setting, and timely provision of comprehensive eye care.<sup>8</sup>
- **HEARING:** Screening followed by provision of hearing aids should be offered to older people for timely identification and management of hearing loss.<sup>8</sup>

Ideally, if healthcare workers, support caregivers and other community-based stakeholders can be trained to screen for vision and hearing loss, and identified losses can be managed earlier than before, then the potential to reduce the number of years of healthy life lost to disability exists. To accomplish this reduction in disability, however, requires buy in from health care providers as well as a commitment to implementation.

To assist stakeholders in implementing these guidelines in a way that can enhance functional abilities, the ICOPE committee created an implementation framework and scorecard. For instance, ICOPE recommends spectacles be a part of vision care and hearing aids be offered to people with hearing loss. But is this enough to ensure meaningful employment or relationships? While hearing aids and spectacles might produce better hearing and vision test results, suggesting some degree of improved corrected capacity, this improved capacity may still be insufficient if the desired functional ability is to have a serious conversation at dinnertime in a noisy communal dining room within a senior living facility. In this situation, in addition to hearing aids and spectacles, this person might also require environmental modifications, and behavioral adaptations, which include reducing background noise, requesting others to speak slowly and clearly in a well-lit room, or asking to be seated in a quieter section of the room.

Another hypothetical scenario could include a person with significant hearing loss who depends on the use of a telephone in a senior residential facility to communicate with her doctor. If the person with hearing loss cannot effectively communicate over the phone, even with hearing aids, then this function might be achieved by adding a phone that provides real time captioned text (Figure 3).



Figure 3. The CaptionCall phone.

Similarly, the older employee who struggled to partake in boardroom discussions because of hearing and vision loss might require more than hearing aids. To be able to effectively contribute to the conversations, the employee might also need a conference microphone system along with paper versions

of the materials he cannot see on the screen (Figure 4). Similar scenarios can be imagined for a person who has low vision. In situations where spectacles may be inadequate for the visual demands of a copy editor, audio descriptions and a well-lit room may prove helpful. Collectively, all of these examples show how a person can improve their functional abilities in spite of reduced IC. These examples also demonstrate the interplay between vision and hearing and how multisensory interventions achieve greater functional ability.



Figure 4. Conference Microphone System

### Eyes and ears – working beyond the limitations

Common causes of age-related vision loss include macular degeneration, glaucoma, cataracts and diabetic retinopathy<sup>12</sup>. In most situations, adults with age-related impaired vision benefit significantly from wearing corrective spectacles or contact lenses. Older adults can even regain full visual function after cataract surgery. This means, if vision care is accessible and affordable for people with age-related hearing loss, early identification and intervention can immediately improve a person's IC, improve their functional abilities, and potentially reduce the number of years lived with disability. also means it is possible to take advantage of corrected visual capabilities to assist and compensate for other sensory systems in need – like hearing loss.

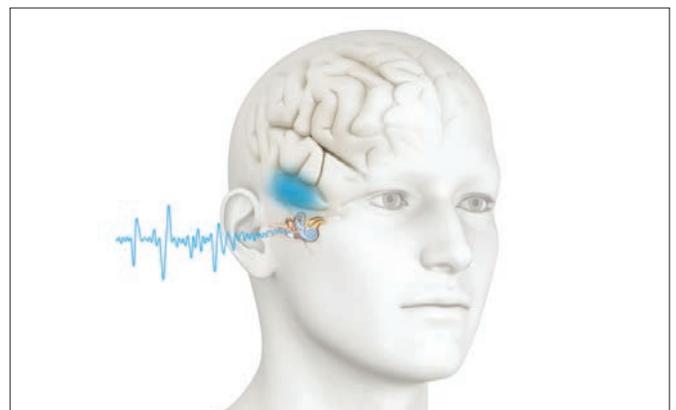


Figure 5. The ear-brain connection.

Because spectacles and contact lenses do such a good job correcting for age-related vision problems and allow people to enjoy normal vision, people are also quick to assume that wearing a hearing aid allows people to hear normally. Unfortunately, the benefits that come with identifying and treating age-related hearing loss are not as robust as those seen with vision care. Hearing aids help by making sound louder, but they do not provide the same quality of sound once heard earlier in life. It's no surprise then that a large portion of people who could benefit from wearing hearing aids choose not to wear them<sup>13</sup>. It also means a large portion of the estimated 432 million adults in the world who have hearing loss severe enough to interfere with their ability to understand normal conversational speech,<sup>14</sup> have hearing needs that are unmet. It also helps to explain why the number of years of healthy life lost from disability is so high.

One of the reasons hearing aids fall short of providing normal hearing is that hearing aids do not repair the biological damage that has taken in the inner ear, or the auditory pathways that transmit sound from the ear to the brain. Damaged hair cells housed in the cochlea (inner ear), and weak sound transduction to the brain via the auditory nerve, are only two of the many ways older auditory systems breakdown (Figure 5). Because the decline in capacity is gradual, beginning in middle age and affecting mostly higher pitched sounds, most people do not recognize the loss of hearing sensitivity until it begins to negatively affect their ability to communicate on the job or with loved ones. Even then, people often wait 7-10 years after their initial diagnosis to be fit with their first set of hearing aids<sup>15</sup>. During this time, auditory centers of the brain are not receiving input from damaged portions of the inner ear. And, because the brain is being deprived of sound input, neurons responsible for relaying sound to the brain and conveying biological codes that underlie our perception of pitch, deteriorate and no longer function. Thus, when sound is reintroduced through hearing aid amplification or other assistive devices, the biological (intrinsic) capacity to encode the amplified sound is no longer optimal. As a result older adults often describe hearing aid amplified sound as being distorted or muffled.

Another reason why older adults describe amplified sounds as unnatural or distorted has to do with the fact that not all sounds are attenuated equally by old age. As people age, they experience a subtle and gradual decline in the ability to hear high frequency sounds. Figure 6 shows a typical pattern of age-related hearing loss, with hearing thresholds for the right and left ears falling within the mild and moderate hearing loss range when high-pitched tones above 1000 Hz are presented. Hearing thresholds at lower frequencies fall within the normal range, which means people will hear lower frequency sounds, such as vowels, at louder levels than high

frequency sounds such as consonants. Without clear and audible consonants, quiet gaps can occur in words. Take for example words that start with the consonants /sh/ and /s/. If these consonants are not audible, the words "she" and "see" might sound similar to each other and create confusion. In fact, because some sounds are quieter than others, people with age-related hearing loss often become frustrated and assume the speaker is mumbling or not speaking clearly. Even when a person wears a hearing aid, the amount of amplification a hearing aid provides isn't evenly distributed across the frequencies and the amount of gain most people need at the most upper frequencies can't be achieved. Thus, normal conversational speech will often sound odd and abnormal to new users of hearing aids.

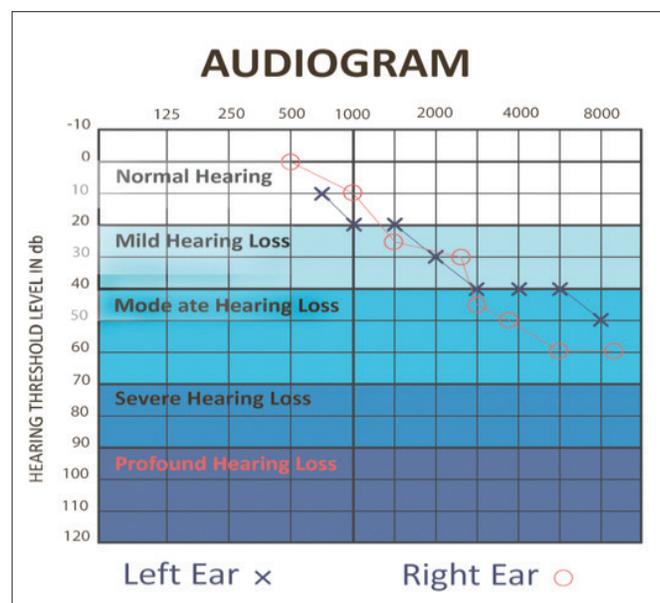


Figure 6. Audiometric results showing a typical pattern of age-related hearing loss

Trying to have a conversation in a restaurant or while using a telephone also pose a problem. In the first scenario, hearing aids can be programmed to enhance sounds within certain listening ranges (e.g., the person standing directly in front of you) while minimizing competing sounds that come from behind and beside you. However, in spite of these advanced features, no hearing aid is capable of completely eliminating all unwanted noise and for some people this makes the use of a hearing aid undesirable. In the second scenario, part of the problem is that telephones do not transmit the full range of frequencies contained in human speech, often filtering out sounds below 300 Hz and above 3400Hz. This means, even when a person increases the volume setting on their phone they still miss out on important acoustic information because it is not being transmitted. Making the situation even worse, without face-to-face communication, the listener on the phone cannot take advantage of the added information that comes from reading someone's lips. To help compensate

for this loss in visual of information, people with hearing loss often use phones that amplify sound while also providing large font, easy-to-read, real-time text (Figure 3).

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### **Additional Strategies for Keeping the Aging World Connected and Productive**

Despite their imperfections, hearing aids and other assistive devices do a good job of making sounds louder. And, using amplification devices help prevent further intrinsic/biological decline related to auditory deprivation. But as previously stated, hearing aids on their own do not guarantee optimal functioning behaviors at home or in the workplace. For this reason, WHO ICOPE recommendations for screening and managing hearing loss will also require alternative strategies to attain functional uses of hearing. Video conferencing (Skype/Face Time/Zoom), for example, allows people to read each other's lips and facial expressions while listening to the auditory signal. Visual cues are also available in the new sound-to-text mobile apps. These apps compensate for decreased hearing capacity by digitally displaying, in real time, words that are detected by the phone's microphone.

Hearing loops<sup>16</sup> are another helpful tool. Hearing loops are helpful when a person finds himself or herself in a room with multiple people. In these situations it can be difficult to hear about a gate change announcement at an airport; it can also be difficult to hear a keynote speaker in front of a large audience. Hearing loops exist in various types of establishments (e.g., convention centers, lecture halls and community centers), and they help because they transmit the desired speaker's voice directly to the ear of the hearing aid user. How does this happen? Looped rooms are set up so the speaker's microphone transmits their voice to multiple wires along the periphery of the room. These wires then relay the signal through magnetic fields, which are then picked up by the listeners' telecoil-enabled hearing aids and funneled into the ear of the listener. While one person might be motivated to use the loop to hear a speaker on stage at a work-sponsored convention, another might use it to enjoy hearing a comedian at a comedy club. Both of these examples serve to demonstrate that it is possible to go beyond your limited hearing capacity in order to partake in functions that are of value to the listener.

Given this age-group is not always tech savvy, non-technological strategies should also be shared. If the goal is to enjoy a coffee with friends, then choose a café or restaurant that is known to be quiet, and request a table in the quietest part of the room. Sit in a well-lit location that enables lip/speech reading, and inform your friends that you have hearing loss and that you'll need them to speak clearly and slowly. If needed, ask management to turn down the volume.

### **Summary**

People are living longer. Despite the inevitable decline in physical and mental health that comes with advancing age, the desire to remain independent, socially connected, and productive does not waver. Sensory impairment (vision and hearing loss) is a major barrier to achieving this desired life as it is the most common cause of years of healthy life lost from disability among people 60 years of age and older. To address the problem, the WHO ICOPE put forth the recommendation that older adults be screened for vision and hearing loss. An assumption is that if healthcare workers, support caregivers and other community-based stakeholders can be trained to screen for vision and hearing loss, and identified losses can be managed earlier than before, then the number of years of healthy life lost to disability will improve. In this whitepaper we moved beyond the identification of vision and hearing loss, as well as the provision of spectacles and hearing aids, to show how additional assistive technology and strategies can be used to keep older people connected and productive as they age.



## Additional Resources

Hearing Loss Association

<https://www.hearingloss.org/hearing-help/communities/employees/employment-toolkit/>

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