

Sound and Vision Toolkit

A resource guide on hearing
and vision technology

About Front Porch Center for Innovation and Wellbeing

We are thrilled to collaborate with the **Consumer Technology Association Foundation** and embark on a campaign to educate and promote the benefits of emerging **hearing** and **vision** technologies to older adults. This toolkit also highlights important information on the implications of hearing and vision loss, suggests hearing and vision smart phone applications, and demonstrates case studies for the applications.

The Front Porch Center for Innovation and Wellbeing (FPCIW) is part of **Front Porch**, one of the nation's largest not-for-profit providers of senior living, affordable housing and community services. In collaboration with innovative partner organizations, the FPCIW pilots and scales promising innovative solutions to solve real-world problems and meet the needs of older adults. Learn about FPCIW's work by reading its impact stories. The FPCIW is a signature program of **Humanly Possible®**, Front Porch's commitment to cause-based innovation and dedication to doing everything humanly possible to creatively meet needs now and in the future. For more information, please visit www.fpciw.org.

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Look for QR Codes and Hyperlinks



These codes appear on pages that show smartphone apps. Scan these codes to be directed to your app store, and download these apps.

Hyperlinks look like this. On the digital version of this tool-kit, these hyperlinnks can be clicked on.

How to scan QR codes

1. Open your Camera app
2. Point your camera to the QR code
3. Tap the pop-up link that appears

Scan with
phone camera



Hearing

Impact of hearing loss



Up to 40%
faster
cognitive
decline³



1/3 people
65 to 74
has hearing
loss¹



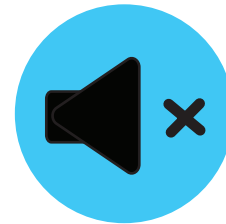
3x fall risk
with mild
hearing
loss



Increased social
isolation from
hearing loss⁴



> 20% with
hearing loss
use hearing
aids¹



Aging
women
difficulty
hearing low
frequencies²

1 <https://www.nidcd.nih.gov/health/statistics/use-hearing-aids-adults-hearing-loss>

2 <https://www.healthyhearing.com/report/52510-Presbycusis-understanding-age-related-hearing-loss>

3 Lin, Frank R et al. "Hearing loss and cognitive decline in older adults" JAMA internal medicine vol. 173,4 (2013): 293-9. doi: 10.1001/jamainternmed.2013.1868

4 Cimarolli, Verena R., et al. "Depressive symptoms in the oldest-old: the role of sensory impairments." Archives of gerontology and geriatrics 78 (2018): 249-254



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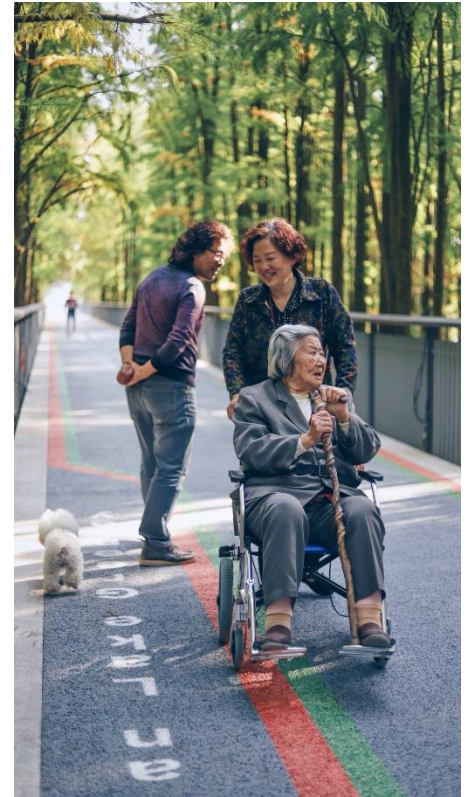
Stigmas & Changing Perceptions

Published by in 2017 by NPR, the article [“Is It Time for Hearing Aids to be Sold Over the Counter”](#) concentrates on the departure of the “stigma” of hearing aids and the changing tides of perception when it comes to hearing loss.

When you picture a “hearing aid”, you might envision a bulky piece of hardware that fits in and around your ear. You may also associate hearing aids with the time and financial costs that typically go into acquiring one: the multiple trips to the audiologist, the process of getting acclimated to using the hearing aid, and the costly expense of paying for and maintaining it. The conspicuous fit and barriers to acquiring a hearing aid have created a certain “stigma” that prevents people who can benefit from wearing a hearing aid to avoid one altogether.

We’re seeing a new competitor on the market: Personal Sound Amplification Products (PSAPs). Companies are developing wireless earbuds that amplify the sounds around the user. PSAPs look more like earbuds for listening to music, rather than clinical. PSAPs are considerably cheaper in comparison to hearing aids, which can cost upwards of \$5,000, whereas PSAPs are typically priced between \$200 to \$350 and can be purchased at popular big box stores like Best Buy and Amazon.

[Next Avenue](#), a media platform centered on healthy aging recently published the article, [“Can Companies Like Apple and Bose Make Hearing Aids Trends”](#) in June of 2021. The article explores one of the biggest hurdles in “hearing-aid” acceptance for older adults: “[A reluctance] to admit they have a hard time hearing”, as stated by Dr. Justin S. Golub, an ear, nose and throat doctor at Columbia University Medical Center. Age-related hearing loss occurs slowly over time, so an individual’s adaptation to their hearing loss may be self-perceived as simply not having hearing issues at all.



The reluctance of admitting to hearing loss is compounded by the “stigma” of wearing hearing aids and their steep cost, which most healthcare insurances don’t cover. However, we’re seeing large tech companies like Apple and Bose developing hearing assistive technology at more accessible price points and available to purchase over the counter, without a prescription and having to visit an audiologist.

[Apple AirPods](#) have been a leading contender at a \$250 price point with hearing assistive features such as “transparency mode” that lets users adjust amplification of sounds around them.



More recently, Bose released \$850 [SoundControl Hearing Aids](#) – the first hearing aid on the market to be cleared by the FDA for direct sale to consumers.

Brian Maguire, Director of Bose Hear, pinpoints the key to “hearing- aid acceptance” for older adults is to “consumerize hearing assistive technology so people look at them as similar to braces or eyewear — two categories that have changed dramatically over the last 15 to 20 years”. The push to change the public perception of hearing aids and hearing assistive technology lies in the hands of manufacturers – a shift that we’re in the midst of. “People of all ages walk around with earbuds, some of which are ‘kind of cool,’; they’re kind of positive status instead of negative status,” Golub points out.



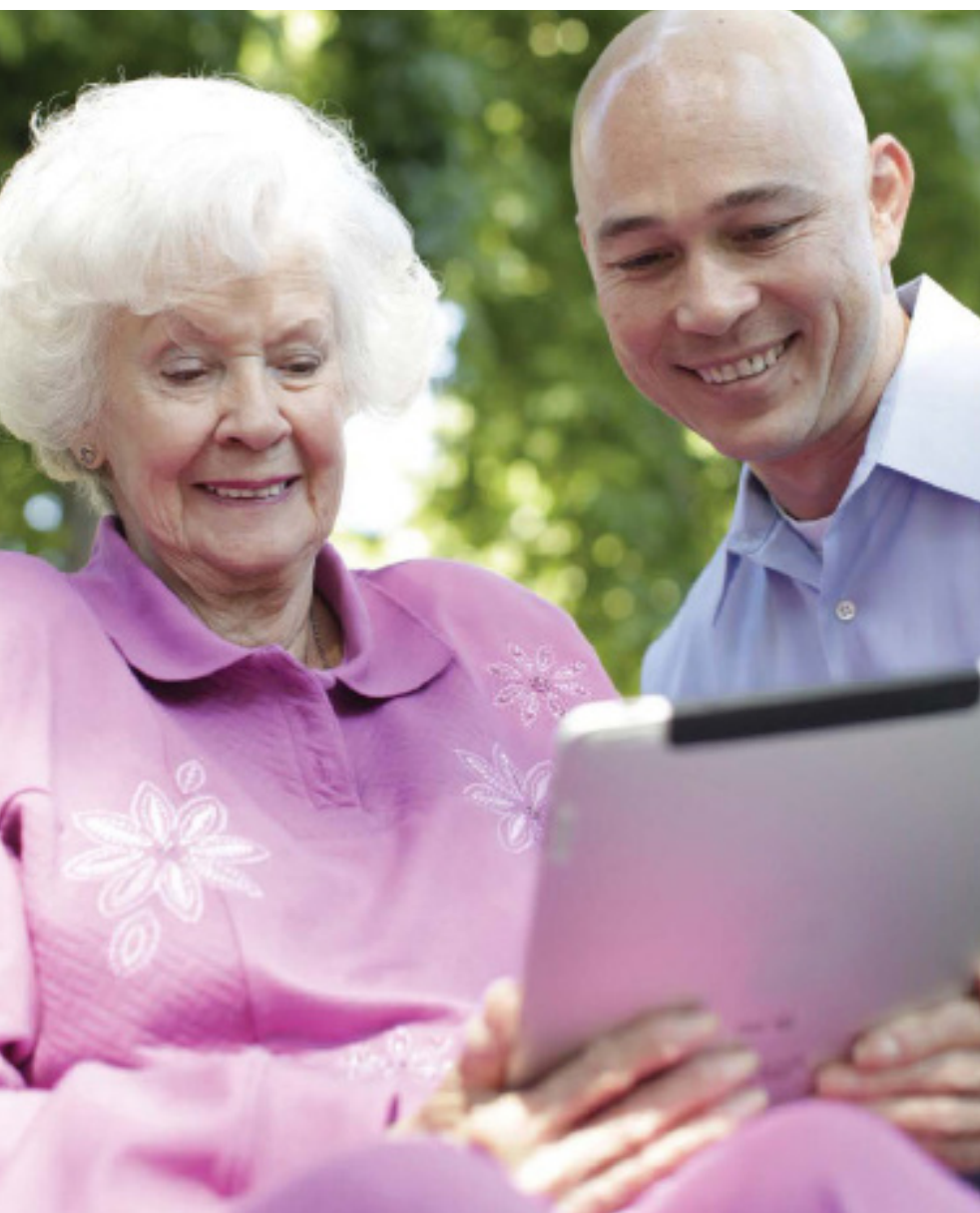
Personal Sound Amplification Products

PSAPs open up the common consumer's accessibility to hearing health

PSAPs are a direct to consumer solution that are not regulated by the FDA. They can be a great over the counter solution for those with mild to moderate hearing impairments. PSAPs rely on the user for self-adjustment through an accompanying smartphone app. From the comfort of your own phone, you can adjust sound frequencies and create “profiles” for different hearing environments (walking outdoors, 1:1 conversation, listening to a presenter in a classroom setting).

Because PSAPs are not FDA regulated, they can only be marketed to people with normal hearing who want to hear even better. Thus, many people with mild to moderate hearing loss who can benefit from PSAPs are not even aware that they exist.

Companies are developing technology that's inclusive and at accessible price points, we are empowered to take our hearing health into our own hands!



PSAP Products

Apple AirPods Pro

Hearing accessibility setting, “Live Listen” allows hearing amplification for mild to moderate hearing loss



A quick boost in loud environments. "Live Listen" uses one Air-pod as a microphone and trans-mits sounds back to the other Airpod.

“Headphones Accommodations” amplifies soft sounds and adjusts certain frequencies based on the user’s hearing abilities. The user sets up an audiogram in the Settings app on their phone, and makes unique profiles based on sound preferences.

Image sources: Apple, NYTimes

Nuheara IQbuds2 Max



NuHeara IQBuds2 calibrate the buds to the user's unique hearing profile. The user is able to enjoy complete noise control and sound fidelity from the IQBuds app. Users are able to adjust sound frequencies and cancel out selective sounds such as enhancing focus on direct conversations in a noise environment.

Nuheara's proprietary Speech in Noise Control (SINC) allows users to quickly adjust their earbuds to their preferred noise setting.



Image sources: Best Buy, Nu Heara

Wear and Hear BeHear Now



Behear Now adjusts the sound in each of the operational modes (ambient hearing, phone calls, and audio/media play). A self-administered hearing assessment completed on the accompanying app during device setup.

- ListenThrough™ – Passing through important ambient sounds during music playback
- EasyListen™ – slowing down speech dynamically during phone conversations
- Hearing enhancement functions – including noise reduction, echo cancellation, and more
- Rechargeable for up to 12 hours of use

Designed for those with mild to moderate hearing loss, the Wear and Hear BeHear Now headset amplifies only the frequencies where you need a boost.

Voice Technology

Amazon and Google have made the shift towards voice integration technology.

Smart home devices carry out spoken commands made by the user, commands like turning lights on and off, song selection, volume, and many more.



NuHeara IQBuds2 Max, Apple Airpods Pro, and Wear and Hear BeHear Now PSAPs can connect with the digital assistants Google Assistant or Apple Assistant Siri on your smartphone. Through voice commands, you can listen to and send text messages, making calls, use GPS navigation, and stay up to date with the news, and more. This can be beneficial to those living with vision loss.

Image sources: PC Mag

Hearables for All 2019

We introduced PSAPs to 101 older adults across 7 affordable housing communities.

Hearing loss continues to be a challenge for older adults. Companies are constantly iterating and creating new technology solutions that are both accessible and affordable.

Hearables 2.0 is the second iteration of our 2019 Hearables for All study.

This project assessed the impact and viability of PSAPs as hearing enhancement solutions for older adults.

Findings from the pilot confirmed:

**57.3% of users
agreed their
PSAP device
increased their
ability to hear**

**29.1% felt their
PSAP changed
their enjoyment
of life for the
better**

**39.3% agreed
they were more
likely to partake
in community
events**

Supported by the Consumer Technology Association

FPCIW Sound Pilot

The FPCIW continues work in addressing the challenges of social connectedness and independence among older adults with age-related hearing loss. In leveraging findings and work from our 2019 “Hearables for All” pilot, we sought to explore emerging innovations and changing consumer behaviors in Personal Sound Amplification Products (PSAPs) that incorporate features inclusive to those with hearing impairments. We recruited older adults with mild to moderate hearing loss and equipped them with a PSAP of their choice:

- [NuHeara IQBuds 2 Max](#)
- [Wear & Hear BeHear Now](#)
- [Apple AirPods](#)

Through our learnings, we found:

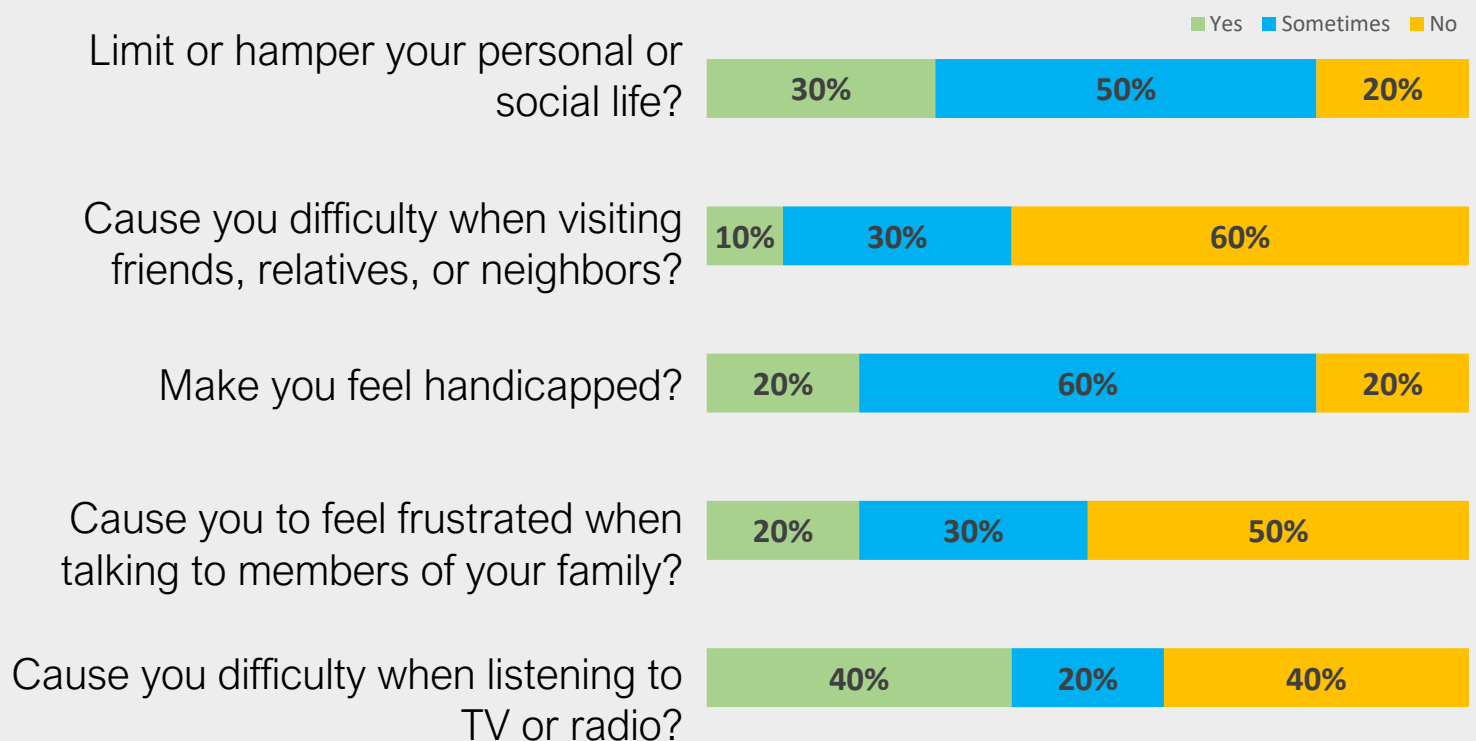
- Hearing assessments done before using the PSAP such as the [Mimi Hearing Test](#), [NuHeara’s Ear ID](#), and [Wear & Hear’s proprietary Hearing Test](#) empowered participants in better understanding their hearing health.
- The majority of participants used their PSAP in their home during the pilot study. Areas of increased hearing abilities included watching TV and talking with friends and family members.
- 50% of participants rated their experience with their PSAP as “Very Good/Good”.
- 27% of participants found the “Volume”, “Noise Cancellation”, and “Directional Focus” features most helpful when using their PSAPs.
- Despite being available for consumer purchase, PSAPs do have a barrier of entry – users must already own and able to operate their smartphone with familiarity.

Study Setup

10 residents participated in our recent pilot study, which took place over the course of 3 months. 1-1 Zoom based training workshops were held with participants to get them acclimated to their PSAPs. Additionally, a FPCIW team member was available via email, phone, or video for immediate technical support. Participants were given surveys to complete on their own bi-weekly over the course of 3 months to track device satisfaction and usage. Following the 3-month pilot period, we conducted Zoom-based exit interviews to gain insight on the participants' experiences and collect feedback on the device and accompanying smartphone app. The pilot included Front Porch residents from Fredericka Manor and Villa Gardens, as well as OASIS members in Los Angeles and San Diego.

Baseline Hearing Results

Does your hearing....



[I found my PSAP most helpful when] watching TV or speaking with my daughter. If I didn't have them on, she would have to repeat some things to me, so I know there's a difference."

-D.B.



"The buds have hugely exceeded my expectations. I just wanted to hear better, and I can, but it also cancels out sounds - especially at restaurants, it is such a pleasure to be able to hear in this environment."

-J.L.



"I have used my 'buds', listening to TV and also as part of a book discussion group that meets outside"

-A.G.





“Having it right now, talking to you on the phone, it improved my ability to talk to other people and communicate 100% - before I was saying ‘huh?’ and putting people on speakerphone, but taking the [hearing] assessment and knowing that it targets those frequencies that have been affected by my hearing loss have created a dramatic difference”

High Score
Medium Score



[Apple Airpods](#)



[NuHeara IQBuds 2
Max](#)



[Wear & Hear
BeHear Now](#)

	<u>Apple Airpods</u>	<u>NuHeara IQBuds 2 Max</u>	<u>Wear & Hear BeHear Now</u>
Cost	\$249	\$399	\$249
Fit			
Sound Amplification			
Noise Cancellation			
Ease of Use			
Would recommend to friend or family member with hearing loss			

Smartphone Apps

Hearing Assistive Technology



Petralex



Hearing Aid



Mobile Ears

Hearing applications (apps) are a great resource for hearing assistive technology available right on your mobile phone! Most are free to download and save you space so that you don't need to carry anything other than your phone. We'll go over a few of the apps that are worthy of taking a look at. These apps do not collect any personal data, but may require users to register for their services by creating a username and password.

Front Porch does not receive incentive from the solutions we are presenting. These are simply solutions we've found worthy of further consideration and research based on independence and social engagement for older adults.

Petralex



- Available for iOS and Android
- \$4.99 / Month and \$35.99 Year
- Hearing test to measure amount of hearing loss
- Custom audio settings, organized in profiles for different people
- Learn how to use the app with the adaptive course

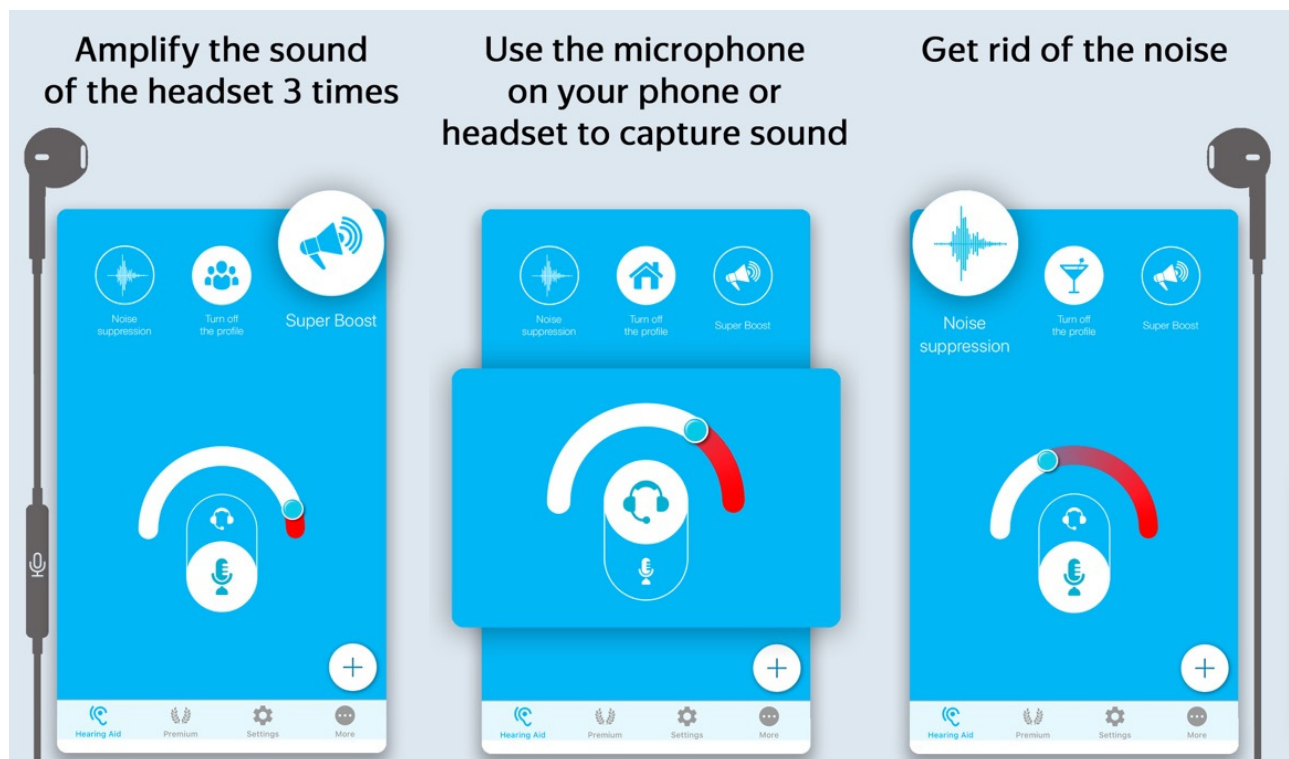


Image Source: <https://www.appreview.com/medical/petralex-hearing-aid-app/>

Android

iOS



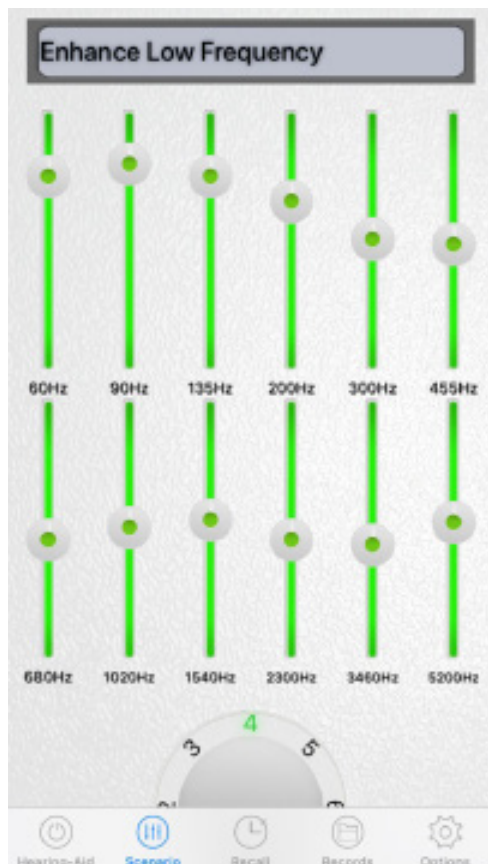
Scan with
phone camera



Hearing Aid



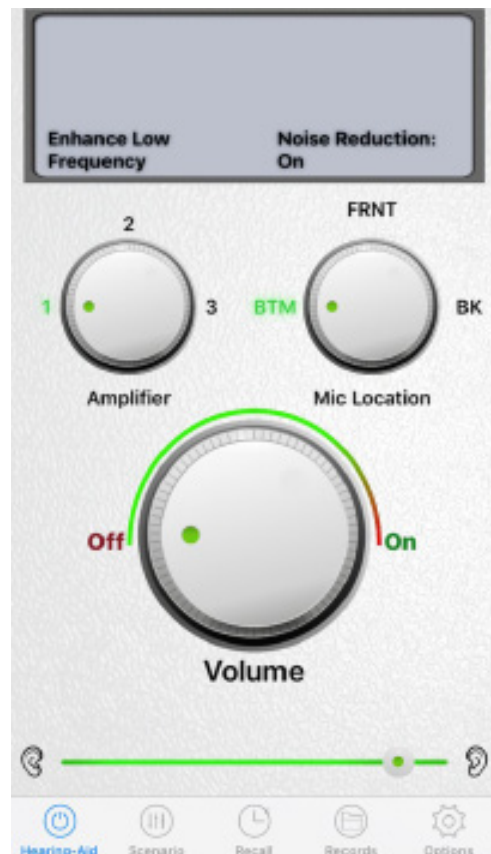
- Only available for iOS
- \$4.99/Mo, \$35.99/Yr (Free 7-day trial)
- Easy to pair with hearing aids
- Customizable “scenarios” for different situations
- Hearing protection
- Live speech recognition



iOS



Scan with
phone camera



Mobile Ears



- Only available for iOS
- FREE
- Speech amplification for several situations
- Requires wired headphones
- Noise filtering and reduction
- Only available for iOS

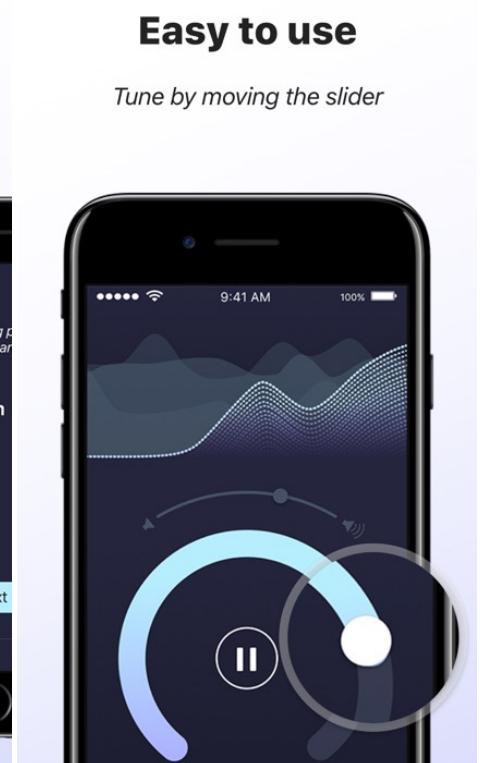
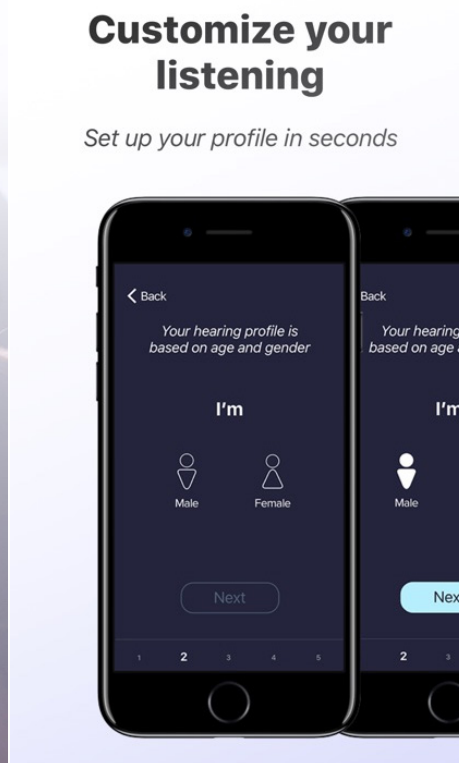
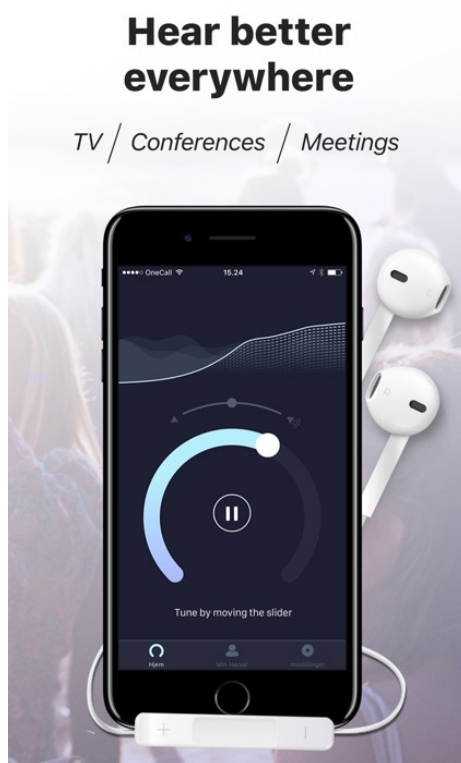


Image Source: <https://appadvice.com/app/mobile-ears-hearing-aid-speech-amplifier/1208952230>

iOS



Scan with
phone camera

Hearing Technology Resources



Podcast



Twitter

Dave Kemp, Oaktree

Dave Kemp works for Oaktree, which is a leading hearing health company on the market, and he's also very knowledgeable with up to date with all things hearing – policy changes, new technology, etc., which he frequently shares on his twitter and podcast.



r/hardofhearing



r/deaf

Reddit

Reddit is a platform to build social connections with people who share the same interests as you.



Scan with
phone camera



Verizon: Assistive Technologies for the Hearing Impaired

Verizon offers a comprehensive guide on hearing assistive technologies, which goes into device feature details and a curated selection of smartphone apps.

Vision

Impact of vision loss



“Vision loss can affect one’s quality of life, independence, and mobility and has been linked to falls, injury, and worsened status in domains spanning mental health, cognition, social function employment, and educational attainment”

As vision loss occurs, it can affect areas such as independence, making things like reading, socializing, and pursuing hobbies a little more difficult. It can also affect basic self care activities of daily living such as eating, dressing, shopping, medication managing and driving.

46.7% of people with severe vision impairment reported having fallen (compared to 27.7% without impairment).

Source: 2016. Making Eye Health a Population Health Imperative: Vision for Tomorrow. National Academies of Sciences, Engineering, and Medicine

Globally, **at least 2.2 billion people have a near or distance vision impairment.** In at least 1 billion – or almost half – of these cases, vision impairment could have been prevented or has yet to be addressed.

The leading causes of vision impairment and blindness are **uncorrected refractive errors and cataracts.**

The majority of people with vision impairment and blindness are over the age of 50 years; however, **vision loss can affect people of all ages.**

Vision impairment poses an enormous global financial burden with the annual global costs of productivity losses associated with vision impairment from uncorrected myopia and presbyopia alone estimated to be US\$ 244 billion and US\$ 25.4 billion.

Source: 26 February 2021. Blindness and Vision Impairment. World Health Organization



According to estimates from the 2018 National Health Interview Survey, **32.2 million American Adults age 18 and older reported experiencing vision loss.**

September 2020. Facts and Figures on Adults with Vision Loss. American Foundation for the Blind

FPCIW IrisVision Pilot

The FPCIW has been exploring technology solutions that can either assist with low vision challenges or even correct vision.

The FPCIW has been exploring technology solutions that can either assist with low vision challenges or even correct vision. We tested the IrisVision headset which aims to help people with low vision to regain as much of their sight as possible. Similar to a virtual reality headset, the IrisVision headset is designed to adjust to a number of vision impairments such as macular degeneration, optic nerve damage, or diabetic retinopathy to provide vision correction during activities such as reading, gardening, or watching TV.

Why we liked it

The headset has voice components to give commands, or to use as a voice-first assistant

IrisVision offers remote trainings and remote tech support for the headsets.

The device is portable and can be used in many different settings and for different purposes.



Study Setup

FPCIW enrolled 8 residents at one of our Front Porch senior living communities over an 8-week period. We provided each volunteer with an orientation, training, and technical support in partnership with IrisVision. Onsite staff also checked in with residents bi-weekly to offer support, while FPCIW team members offered weekly office hours.

The pilot was conducted at our Front Porch Wesley Palms location, which currently holds a vision friendly community status from the Braille Institute.

Image Source: NYTimes

Results

4 of 5 post surveys collected indicated a 3 or higher on a scale of 1-5 of usefulness (5=most useful)

3 of 5 were able to watch more TV because of the headset.

4 of 8 volunteers dropped out before the end of their two month test

"I hadn't seen my wife's face in 5 years"

"(The headset) is too cumbersome for me"

"I messed up some of my trainings — I couldn't get things right."

"It feels comforting being able to see things clearer"

Conclusions

IrisVision can be a valuable tool for the right person with the following qualities:

Has low vision conditions, but is not completely blind.

Is patient and open to learning new technology.

Has enough cognitive and hearing abilities to hear the instruction given by IrisVision over the phone.

IrisVision for Veterans

The Department of Veteran Affairs offers coverage for head-mounted visual assistive devices for qualifying veterans.

If you or someone you know is a service member with low vision conditions, you may qualify for a free IrisVision headset!

This process requires being registered in the VA system and includes being examined by an optometrist to determine what kind of vision device best suits the individual's needs and goals.

The Front Porch Center for Innovation and Wellbeing recognizes this great opportunity and has done outreach to the veterans in 7 of our own communities to



guide interested participants through the process.

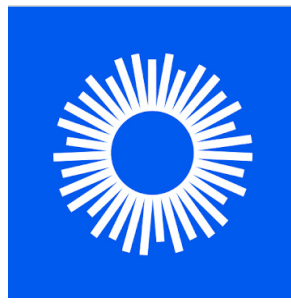
If you or someone you know is interested in seeing if you qualify for this offer, please contact your local VA VIST Coordinator for more information.

Smartphone Apps

Vision Assistive Technology



Sullivan +



BeMyEyes



Aira

Vision applications (apps) are a great resource for vision assistive technology available right on your mobile phone! Most are free to download and save you space so that you don't need to carry anything other than your phone. Some can act as a magnifier and others can connect you to a live agent who can immediately assist you with identifying objects or reading your mail. We'll go over a few of the apps that are worth a look.

Please note that these apps do collect personal information and depending on their privacy policy may share data with third parties.

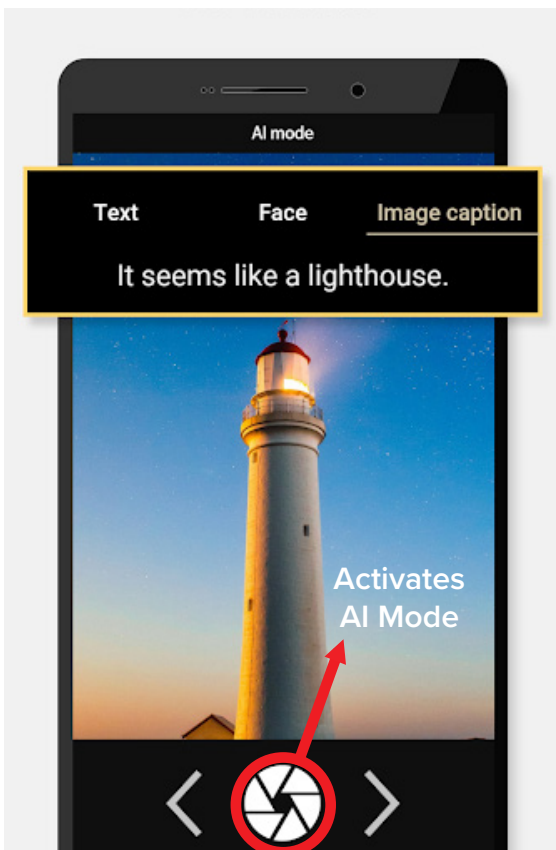
Front Porch does not receive incentive from the solutions we are presenting. These are simply solutions we've found worthy of further consideration and research based on independence and social engagement for older adults.

Sullivan +



The Sullivan+ app acts like a magnifier on your phone. Use the large plus or minus buttons. Also use the AI mode, which identifies an object or text with your smartphone camera.

Use the main round button in the lower middle of the screen. The app will then tell you what the object is. If the object has writing, it will read out what it says. Tap the left arrow on the screen to display other modes!



Pros: Serves as a handheld magnifier. AI determines what the user is looking at. Use the app for video calls. Free to download.

Cons: May not always 100% accurately identify the object

Android

iOS



Scan with
phone camera

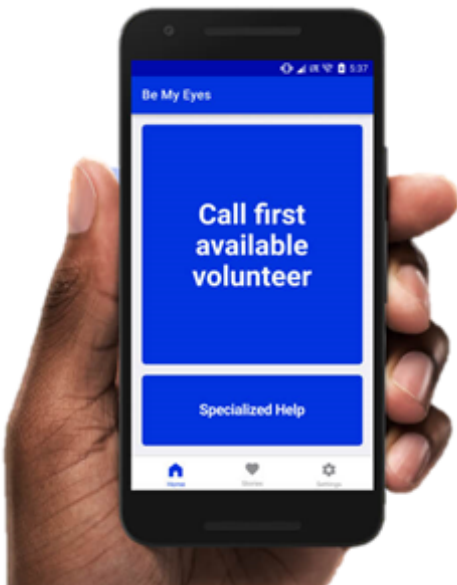
Image Source: Google Play Store

BeMyEyes



The BeMyEyes mobile app provides live person assistance with a volunteer. The volunteer on the line uses your phone's camera to see what you are seeing.

You can point your phone camera at anything you'd like to be identified or read, and the volunteer on the line will tell you what they see.



Pros: Available for iPhone and Android. Human connection element. Volunteers available 24 / 7. Quick connection to a volunteer. Easy to use. Free to download

Cons: Chance of making mistakes. Specialized help seems more like app advertisements

Android

iOS



Scan with
phone camera



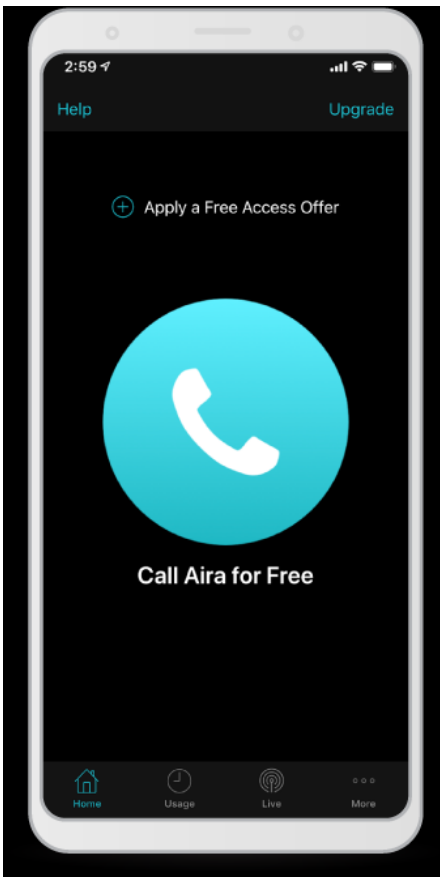
Image Source: Google Play Store

Aira



Aira is a mobile app similar to BeMyEyes where you can receive real time assistance from a live agent

The agent sees what you are pointing your device camera at. They will then identify the object or read the text that the camera is pointed at.



Pros: Available on iPhone and Android. Human connection element. Free 5 minute calls. Can connect rideshares accounts so that an agent can call an Uber or Lyft for the caller

Cons: Limited time on phone before having to pay. Phone screen doesn't display what agent is seeing. Chance of making mistakes

Android

iOS



Scan with
phone camera



Image Source: Aira

A Case Study of Vision Apps

A 3-week long case study with one participant. The participant met the criteria of an older adult with low vision conditions with enough comfort with technology to meet for Zoom trainings, determined by a pre-study survey.

Learn, test, and rate

The participant was tasked to 3 pre-selected mobile vision apps for 3 weeks (one app per week) over Zoom calls.

Weekly learning

The participant learned how to use one pre-selected vision app at the beginning of each week over Zoom calls.

Satisfaction surveys

At the end of each week, the participant filled out a satisfaction survey on the vision app they learned. They also participated in a 15 minute call to give more detailed feedback on their experience.

From the participant satisfaction surveys

With a 0-10 scale rating on if they would recommend the apps to a friend. 10 being most likely to recommend:

Sullivan+ (9)

BeMyEyes (9)

Aira (3)

General Feedback

Were these apps easy to learn and use?

“Yes”

Did you find the app useful?

“YES” for Sullivan+ and BeMyEyes. Responded “OTHER” for Aira.

What aspects of daily living did the vision apps help address most?

“Just practicing the camera and reading. I’ve been using Sullivan+ on my walks. Use it as a helpful identification thing. I used Sullivan+ app to read printed emails.”

Which parts were most helpful?

Sullivan+: “AI, light, magnifier and text recognition”

BeMyEyes: “talking to a real person”

Aira: “was questionable”

From weekly check-ins with the participant

Sullivan+

Used the app 3-4 times a day in one week.

- “I like the utility and functionality.”
- “I like that it’s all in one, cuz I usually use a magnifier. (used it in place of my magnifier and for light)”
- “What I couldn’t do was the visual phone call. Maybe person on the other end needed Sullivan+.”
- “I’m sold on it, I think I’ll continue using this in the future.”

BeMyEyes

When trying it for the first time, the volunteer was very warm and personable.

- “Would be very useful in case of an accident or emergency.”
- “Easy to navigate, felt very comfortable using it.”
- “I would make good use of it in the future.”

Aira

- “I did the training, but was disappointed the orientation person pushed the paid options too much.”
- “I didn’t use the app because I was disappointed from the orientation.”

Get in touch!

HEARING



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To learn more about our
work, visit us at

<https://fpciw.org/>

Acknowledgements

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Technology partners have been critical to the testing and piloting of our hearables solution, and have been generous with their time and lending of test devices. FPCIW extends our great appreciation to Apple, NuHeara, Wear & Hear, IrisVision, Aira, and BeMyEyes for their partnership in providing their hearing and vision assistive devices and guidance to support our research to help make hearing devices more accessible. Lastly and with gratitude, we would like to thank the Consumer Technology Association for the grant funding that has made this study possible.

A special thank you to Zeida Dixon for designing this toolkit and bringing our creative vision to life!

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AND WELLBEING