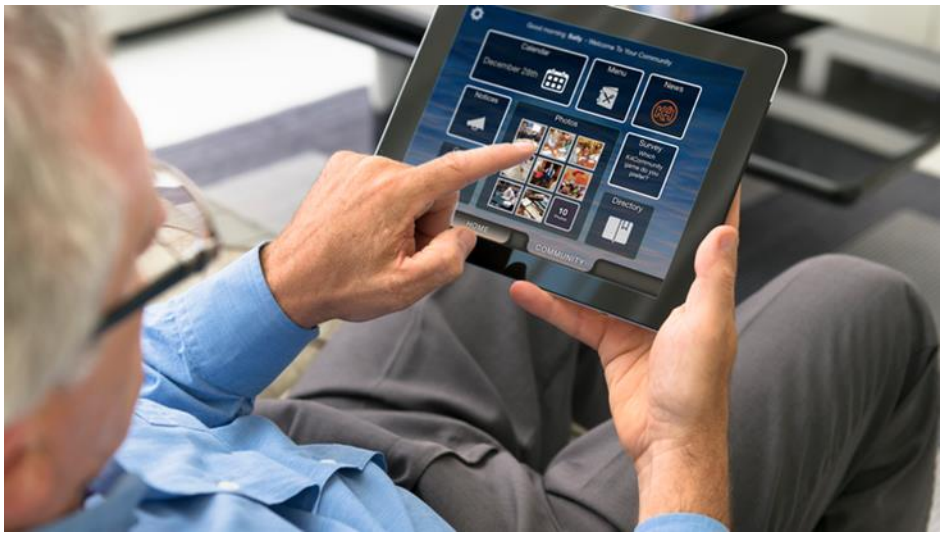
Smart Devices for Resident Care in Independent & Assisted Living Facilities

Care Manager & Staff Guide



Seniors Independent Living Collaborative

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Contents

Introduction

This guide is intended to inform care managers and staff about the beneficial uses of smart devices to enhance resident care and quality of life in independent and assisted living facilities.

Smart devices utilize the Internet and wireless communication technology to remotely monitor and control electrical equipment in a home or residential facility and to improve the safety, security, convenience, and communications of their occupants. In independent and assisted living (I&AL) settings, these devices have been effectively used to mitigate hazards, respond to emergencies and to enhance resident well-being, independence and connection to their families, friends, and healthcare providers. Appropriate smart device applications will vary by facility type, and by the disability they are employed to support.

The content of the guide is derived from research funded by the Illinois Science & Energy Foundation (ISEIF) and conducted by the Seniors Independent Living Collaborative and the University of Illinois Chicago. That research was conducted in the fall of 2020 and entailed a review of the relevant literature, and a survey and interviews with administrators, engineers, and care providers at nine independent and assisted living facilities in Illinois.

The guide is organized in six sections providing:

- An overview of smart device applications for independent and assisted living settings;
- A description of important accessibility features for mobile devices;
- A discussion of the influence of age on smart device adoption among residents;
- A description of device applications to mitigate the impact of the COVID-19 pandemic that include Communication Devices, Social Media and Video Conferencing Apps, Monitoring Devices, Hazard Detection Devices; Smart Appliances; and Device and System Controllers;
- A listing of smart devices and pricing by application; and
- Some additional resources on smart devices to enhance independence and caregiving.

Applications by Facility Type

Independent Living Settings

Operations of independent livings typically include: housing accommodations designed for individuals 55 and older; convenience-type services (e.g., meals, transportation, beauty and barber salons); communal social opportunities; exercise, health and wellness programs; and amenities (e.g., recreation, fitness). Housing can include: apartments; cottages; condominiums; single family homes; and public housing for low-to-moderate income older adults. The following subsection discusses common needs and challenges of independent living residents and illustrates useful smart device applications. Following that is a discussion of roles and responsibilities of independent living care managers and staff and illustrations of useful smart device applications. Later in the guide, descriptions and pricing of smart devices relative to the applications discussed here will be provided.

Resident Applications

Survey research and interviews with care managers and staff indicate that personal safety and human connectedness are among the greatest needs of residents in independent living communities. This subsection describes these and other needs and challenges that smart device applications can be used to address.

Common needs and challenges that influence older adult's choices of moving to an independent living facility are related to: personal safety and security; independence and autonomy; convenience; and human connectedness, loneliness, and isolation. Independent living facilities do not provide physical health care monitoring and care. Likewise, independent living facilities do not provide memory care for those with dementia or other types of cognitive impairment. If residents need limited or lower levels of health care and/or assistance with activities of daily living, then they are commonly allowed to hire and contract out for third-party home health care and/or personal care services. If physical and cognitive health conditions and challenges cannot be managed by the residents or with third-party agencies, a move to an assisted living facility, skilled nursing facility (SNF), post-acute rehabilitation facility, or relative's home is likely. Independent living housing can provide peace of mind to older adults who no longer feel comfortable living alone. Independent living can be an ideal for older adults who desire peer companionship and are physically and mentally healthy enough to live safely in their own residential unit. Independent living communities are intended for older adults who are active to the greatest extent possible and desire to live in a secure environment.

Smart device applications can provide safety features to support personal independence and autonomy for residents. For instance, smart appliances with automated programming (e.g., on/off features, temperature controls) can make meal preparation safer and easier. For those who use smart smoke or gas detectors, these have proven most helpful when residents forget to shut off their stoves and alerts are sent to the resident or staff or third-party device company. Smart doorbells and door cameras set up for individual residential

units can provide safe monitoring and tracking by allowing resident to see and hear expected or unexpected visitors before allowing entry.

Independent living residents can benefit from both the safety and convenience of digital assistants and smart hubs and device controllers. Such devices could control smart thermostats to regulate temperature control and potentially reduce utility costs at peak use times. Smart lighting controls can provide safer visibility for residents in navigating their individual residential units and offer such features as automatically turning on and off lights when entering or exiting a room. Smart door locks could minimize the worry of forgotten or misplaced keys, wondering if a door was locked before departing, or being at home to allow entry to family members or others.

Smart emergency alert devices, such as watches and necklaces, can offer greater safety and security to residents who live alone in their individual units. In the event of a fall, they can send an alert to care staff or a family member that identifies their location and communicates the need for assistance. Another example of a smart device supporting residents' health and safety is an automated pill dispenser. Such devices allow for safe and convenient tracking of medication usage and dosage.

Research shows that loneliness and isolation are further minimized by a support network of friends and family and improving the residents' living conditions to maximize independence and the ability to be active. Independent living communities offer an environment that decreases risks for loneliness and isolation. Loneliness is a significant predictor of poor health and a common source of distress, suffering, and impaired quality of life. Risk factors for loneliness and isolation include lack of transportation, mobility impairment, and limited opportunities to engage with others.

Health outcomes in older adults may be improved by independent living communities that promote social engagement and help residents maintain interpersonal relationships. Human connectedness is an important need and preference of independent living residents. In an independent living community, residents have more choice and preference (as compared to assisted living residents) in the regularity and frequency of contact with the staff and other residents. For example, a resident who eats every meal in the communal areas might frequently see staff and other residents, but someone who prefers a quieter existence might have more limited contact with others.

Smart device applications can enhance and expand human connectedness. Smart phones, tablets, and other devices like Amazon's Alexa Echo Show can connect individuals with audio, video, and messaging capabilities. Photographs or documents can be shown and transmitted. Individuals can virtually participate in social gatherings, family discussions, and get-togethers with friends. The application of smart devices can foster human connectedness and lessen loneliness and isolation.

As people age, it's typical for family members and sometimes for independent living care staff to become more involved in care decisions. Smart device applications can be used for virtual telehealth appointments between residents and primary and specialty care medical

providers. Or, telehealth appointments can also include independent living care staff and family members who can participate in residents' health care planning and provide support and advocacy. Telehealth appointments using smart devices minimize the need for transportation to health provider offices, navigating outdoor weather elements, and leaving one's home when faced with acute or chronic health conditions.

Care Staff Applications

Independent living care managers and staff provide regularly scheduled supportive services to residents who need assistance with instrumental activities of daily living to maintain their highest degree of independent living. Care plans with residents outline the activities and services to be provided by staff or arranged with third-party providers (e.g., homemaker services, home health). Care staff roles and responsibilities typically fall into the categories of social interaction social and recreational; personal care; nutrition; home management; and information and resident advocacy.

Social and recreational roles include companionship, talking and listening with residents, life reviews, and reminiscing. During companion interactions between staff and residents, photographs, videos, and digital messages can be shared by residents and staff to nurture the human connectedness of the moment. Care staff is there to encourage residents to maintain relationships and communication with family, friends, and others in the community. Care staff can help residents' access, learn, and use smart devices for phone or video visits or virtual participation in social gatherings. Assisting residents with reality orientation and awareness can be another role of care staff. Smart devices, such as phones or tablets, can provide resources for residents to read news and social media to remain current on events. Games and hobbies offer recreational activities of enjoyment and physical or intellectual stimulation for residents. Such activities may be hands-on with residents or smart device gaming apps (e.g., word games, card games, online social community activities, trivia) could be introduced and learned.

Assisting residents with personal care is part of the role and responsibility of care staff. For instance, care staff can assist residents in accessing and learning to use smart device apps for personal fitness. Exercise and other personal fitness activities may be solely for health and wellness maintenance and improvement or may be prompted by physical rehabilitation needs (e.g., post knee replacement therapy exercises, weight bearing and strength training exercises). Personal care can also involve assistance with medication management. While independent living care staff would not be administering medications, they could assist residents in setting up reminder systems using smart devices (e.g., smart pill dispensers or audio reminders) for tracking medication usage and dosage.

Nutritional support may be provided to independent living residents by care staff in the form of assistance with meal planning and preparation. Beyond providing assistance with nutrition and food preparation, care staff are often called upon to help residents with household

maintenance chores and management. Assistance with laundry in a common utility area may involve teaching and helping residents use smart washers or dryers. Assistance with errands and shopping may involve organizational and planning tool apps to track lists on a smart phone or tablet. Assistance with money management, bill paying, and filling out forms may involve online banking payments or completing and transmitting forms as online submissions on smart phones, tablets, or computers. Home management involving repairs may include assistance with resident decision-making and installation of products such as smart light bulbs, smart outlets and plugs, and control device systems to operate these home automation products. Another home management example relates to smart smoke and gas detectors and leak detectors. In addition to notifying residents of alerts, care staff can be alerted to the problem of smoke, gas, or leaks in residential units.

Independent living care staff are often the first people who learn of residents' need for information and sometimes advocacy in managing their personal business and their lives. Smart phones and tablets can offer easy and fast means to access and share information with residents. Such information and advocacy can include: information about and eligibility for community services and assistance in enrollment, ; helping residents sign up for and receive a needed service (e.g., food stamps, visiting nurse, Supplemental Security Income, Medicaid, Medicare); and bringing unmet needs to the attention of others (e.g., transportation services, health care provider availability) to the attention of others. Residents may also need assistance in learning how to access information, set up alerts, and dial phone numbers on voice-activated digital assistant devices such as Google's Home Mini device.

Assisted Living Settings

Operations of assisted livings typically include: 24-hour supervision and assistance; exercise, health and wellness programs; housekeeping and maintenance; meals and dining services; medication management or assistance; health monitoring; personal and comfort care; and transportation. In addition, a number of assisted living communities serve populations with specialized needs of Alzheimer's disease, other forms of dementia, and intellectual and developmental disabilities. The following subsection discusses the physical and cognitive challenges and needs of assisted living residents and illustrate useful smart device applications. Following that is a discussion of roles and responsibilities of assisted living care managers and staff and illustrations of useful smart device applications. Later in the guide, descriptions and pricing of smart devices relative to the applications discussed here will be provided.

Resident Applications

Assisted living is part of a continuum of long-term care services designed for individuals who desire and/or need assistance with activities of daily living and self-care in ways that promote maximum independence. A range of common physical and cognitive challenges are present in assisted living residents. Care managers and staff provide the majority of direct and in-person care services and support to residents. Common physical and cognitive challenges include but are not limited to the following areas: limited mobility and moderate to advanced levels of personal self-care with activities of daily living (e.g., bathing and showering, hygiene and grooming, dressing, continence management, mobility, and self-feeding); basic medical management; post skilled care rehabilitation living environments; and dementia or other types of cognitive impairment.

With respect to mobility, the ability to self-ambulate and transfer oneself from place to place are typically required criteria for residents in assisted living. Still, limited mobility issues are a common physical challenge for residents. Limited mobility, along with impaired gaits and unsteady balance increase the risk of falls. Personal emergency response systems are examples of an assistive technology device that can help a person with physical disabilities. Usually, these devices come as a wearable bracelet, pendant or pin that is attached onto clothes. By pressing a button on the device, the person in need can alert staff in an emergency.

Beyond mobility issues, assisted living residents may be challenged by other physical limitations or disabilities. Smart device assistants, like Google Home or Amazon Echo, help people with limited use of their arms and hands to be able to use easily their computer or phone. These devices can perform an array of routine tasks like make an appointment, play music, tell the weather, make movie recommendations and respond to basic questions expressed aloud by the user about events, persons or any kind of data available on the Internet.

Also, the use of smart environmental control devices by people with physical limitations and disabilities can allow for operation of lights, thermostats, or electronically controlled doors. Adaptive device tools, like keyboards or switches allow those with physical disabilities and motor skill limitations to write, dress, groom, play games or use smartphones, tablets and computers. Some of these devices have specialized handles and grips and these devices extend reach and allow people to hold objects like spoons, pencils or toothbrushes. Adaptive switches are devices that make it possible to activate and operate any switch-enabled device, like smartphones, tablets or computers. These switches can be activated by pressing them with the hand, head, forehead, chin, legs, or whatever is suitable for the person with the physical disability. Software, like the app from Mouse4all, interfaces between the switch and the electronic device (smartphone or tablet) to operate it with relative ease without needing to touch its screen.

Another assistive technology device is a mouth stick. This is a stick placed in the mouth of the person with a physical disability, so that they can do things like manipulate a trackball mouse, type on a keyboard, or a touch screen. Head wands allow similar means as mouth sticks, by strapping the stick to the head wand. Tools, such as automatic page turners or book holders, can help people to read. Sip-and-puff systems are useful for people with paralysis or fine motor skill disabilities. With these, the user can operate a computer, a mobile device or even a wheelchair with their mouth. The sip-and-puff system behaves like a joystick that is moved in any direction with the mouth and can interpret the breath of the user with on-off operations.

An on-screen keyboard allows the user to type anything using the same movements. An adaptive keyboard can be counted also as another tool available to those users with physical disabilities that impair reliable muscle control in the hands to do precision movements. These keyboards have raised areas in between the keys to allow the user to place correctly the hands on them and find the correct key by sliding the fingers towards it rather than having to strike it. Another option is to use keyboards overlays over a conventional keyboard, and the use and results are basically the same.

Eye tracking devices are communication and control systems that follow the movement of the eyes and allow individuals with disabilities that restrict speech to navigate through their computer or mobile devices with only eye movements. These assistive technology device applications allow users with physical disabilities to interact with the world with their eyes. Special software allows the person to type by looking at control icons or data displayed on a screen and may include word-completion technology to speed up the process. The user can then generate speech either by typing the message or by choosing from a selection of phrases.

Voice recognition and speech generation are other assistive technologies useful for those people with physical disabilities who cannot enter instructions intended for computers with keyboards or touch screens. Some specialized voice transcription software is used for commanding data or instructions to the computer and this allows people with different abilities to use their computer or mobile devices efficiently by only talking to them. With devices equipped with this voice recognition technology, it is also possible to create text

documents. Speech generating devices allow people to communicate aloud, by means of an electronic device that is able to create speech from text, icons or images. These technologies depend on clarity in the pronunciation of words or speech, so it may not be useful for persons who cannot vocalize properly.

For a limited number of assisted living residents who have kitchen appliances in their units, smart-phone applications for turning kitchen devices on and off or hazard detection device alerts for smoke are useful safety features. For the bedroom environment, applications that assist with turning lights or alarms on and off can provide greater ease with sleep routines. The bathroom is a high-risk area for residents with physical and cognitive challenges. Personal care in bathroom areas involves multiple physical movements and manipulations and there is also the presence of multiple water sources which can create slippery surfaces. Bathroom safety functioning can be enhanced through smart phone applications for hot water controls to regulate temperature and prevent burns and scalding or to alert users and staff to water leaks. In bathroom areas and other rooms, smart monitoring devices, such as smart watches or smart necklaces, can alert care staff to a resident who has fallen or experienced other types of distress.

The challenges of living safely and independently after a skilled care (i.e., nursing home) stay can prompt a need for temporary or permanent post-rehabilitative stays in assisted living facilities. Individuals may restore only limited physical or cognitive functioning after a skilled care stay for a surgery, an accident, or a catastrophic event such as a stroke or an aneurysm. Consequently, returning to live alone or in one's own home with others may not be feasible. And, remaining in a skilled care facility (i.e., nursing home) would not be appropriate, as the level of needed care is not extensive enough. In such cases when living independently or living in skilled care facilities are not the best or most suitable options, assisted living facilities are typically the best "middle ground" alternative for one's living environment.

Thus far, the aforementioned challenges have primarily focused on the physical. Cognitive challenges are common among assisted living residents. Dementia, primarily Alzheimer's disease, is the most common diagnosis associated with cognitive challenges. Other types of dementia and cognitive impairment can be attributed to delirium, depression, prolonged or irreversible vitamin deficiency, brain tumors, brain trauma, thyroid or organ disfunction, or alcoholism. Dementia and other cognitive impairments can hinder residents' safe physical and environmental functioning, performance of activities of daily living, basic medical management (e.g., proper medication usage and dosing), meaningful community engagement and social networking, and recreational and leisure activity involvement. According to the Alzheimer's Association, mild to moderate dementia and other forms of cognitive decline impact over half of all assisted living residents. More specifically, the National Survey of Residential Care Facilities' (NSRCF) findings estimate seven out of ten assisted living residents have some form of cognitive impairment, with 29 percent having mild impairment, 23 percent moderate impairment, and 19 percent severe impairment.

Furthermore, more than one-third of assisted living residents display behavioral symptoms, and of these, 57 percent have a medication prescribed for their symptoms. Many assisted living facilities have designated memory care units for residents with dementia or other types of cognitive impairment. Memory care is designed to provide a safe, structured environment with set routines to lower stress for residents.

Especially for older individuals who experience dementia, memory aids and technology can be complementary. Some examples of useful technologies are jumbo analog clocks with a daily calendar, talking clocks, voice-activated phone dialers, automated pill dispensers with a message machine and time, and a "find-it" beeping device to keep track of small items, such as car keys or glasses. Depending on the individual, only one or a variety of technologies can benefit care for an older individual.

Assistive Technology Planning

To assist care managers in planning for the use of assistive technologies, the authors recommend contacting the Illinois Assistive Technology Program (IATP). The IATP's mission is to: "increase access to and the acquisition of Assistive Technology devices and services for individuals of all ages with disabilities."

The organization provides:

- Device demonstrations of assistive technology
- Loans of AT devices
- State financing for assistive technology
- A device reutilization service
- Training and technical assistance, and
- AT policy development and advocacy.

Devices are available to further support impairments related to vision, hearing, speech and mobility.

For more information, contact the Illinois Assistive Technology Program at 217-522-7985 or visit their website and their searchable Device Loan Inventory under the "Device Category" drop down menu at: https://deviceloan.iltech.org/SearchInventory.aspx

Additional information also can be found at the Smart Self Reliance website, in particular the *Smart Devices & Services for Independent Living Guide* located at: https://smartselfreliance.org/wp-content/uploads/2020/10/Indep.-Living-Guide-Final-10.28.20.pdf

Care Staff Applications

Assisted living care managers and staff have continued to be one of the fastest growing professional industries. The U.S. Bureau of Labor Statistics showed personal care aide jobs grew 70.5 percent between 2010 and 2020. Care managers and their staff provide care and monitoring with mainly functional care and, beyond that and to an extent, medical care. Functional care is provided to disabled, chronically ill, and less independent residents with activities of daily living. Medical care is typically focused on basic medical management,

such as monitoring residents' vital signs and providing medication reminders and assistance. Care staff assist residents with other tasks like physical mobility exercises and recreational and social activities.

From our discussions with assisted living care managers, our research shows that assisted living care managers and staff desire and appreciate smart devices that free staff to attend to other duties while still being able to monitor resident health and safety. Smart health monitoring devices used by some assisted living facilities generate real-time health metrics and offer the advantage of knowing residents' vital signs (e.g., O2 levels, temperature level) at various charting times during the day. Smart devices, such as cameras, doorbells, and occupancy sensors, provide a means for staff to monitor and track residents' movements and locations. Such devices assist care staff in knowing if residents are safely and securely located in their individual units or designated common areas. For instance, monitoring and tracking devices can provide alerts of a resident who has fallen, surveillance of a resident (especially those in memory care units) who is prone to wandering, and awareness of arrivals/departures of residents' visitors.

Common Site Applications

Regardless of whether you work with residents in an independent or assisted living community, there are common smart device applications that would be beneficial for use in either type of facility. Some have been previously mentioned in specific examples for independent living or assisted living residents or staff. Smart device applications are also available in our companion guide entitled: *Smart Devices & Services Supporting Independent & Assisted Living Facilities: Administrator's & Engineer's Guide*.

Communication Devices

Smart devices can provide residents and their family members, friends and care providers an effective means of connecting and communicating with each other.

Social Media and Video Conferencing Apps

Communication devices allow residents to connect with others through online social networks, chat rooms, and video conferencing on any computer or mobile device. Video conferencing technology also enables a resident to communicate with and receive treatment through telemedicine capabilities that almost any mobile device will support.

Monitoring Devices

Smart devices that sense human activity, detect anomalous events and send alerts to those monitoring on mobile devices include smart emergency alert devices, smart health monitoring devices, smart cameras and monitors, smart doorbells, and smart occupancy sensors.

Hazards Detection Devices
These devices notify residents and facility managers of hazards via alerts sent to smartphones, mobile devices, or digital assistants and include smart smoke and carbon monoxide detectors, smart leak detectors, and smart air quality sensors.

Smart Appliances
These devices allow residents and staff to remotely control the operation of kitchen and laundry equipment through use of a mobile device. Smart appliances can include: smart refrigerators to track grocery purchases and facilitate re-ordering, temperature controls, camera imaging; programmable smart washers, dryers, dishwashers and ovens; smart cook-tops/ranges featuring timers, motion detectors and automatic shut-down controls; and smart air quality purifiers that monitor and control air quality and odors.

Device and Systems Controllers
These smart devices can remotely control facility and residential unit lighting, heating, air-conditioning, humidity, security systems, and appliances on a single mobile device or by voice-command. They overcome the challenge of having to learn the operating characteristics and commands of different software applications that manage each connected device. Some also feature voice-command operation enabling use by those with motor skill and/or visual limitations. Others can provide information on real-time weather conditions, energy consumption and utility cost information. They include smart plugs, lighting and dimmer controls, thermostats, hubs and device controllers, digital personal assistants, in-home displays, and door locks.

Mobile Device Accessibility Features

Accessibility features are available on most mobile/command devices to modify the appearance and operation of smartphones and tablets to accommodate disabilities that would otherwise prevent residents from being able to control smart devices. This section of the Guide describes accessibility features found on both Apple iOS and Android devices that enable all persons with disabilities to live more independently.

iOS Accessibility Features

iOS is the operating system Apple uses for iPhones, iPads and iPod Touch. It supports more accessibility features than any other operating system on the market today, making Apple the accessibility leader in the mobile computing industry at the present time.

iOS Accessibility Features-Apps

	Visual	Hearing	Mobility
Siri	X	X	X
VoiceOver	X		
Audio Descriptions	X		
Dark Mode	X		
Display Accommodations	X		
Zoom	X		
Font Adjustments	X		
Magnifier	X		
Audio Magnifier	X		
Speak Screen	X		
Dictation	X		X
Accessibility Shortcuts	X		
iPhone and iPad Hearing Aids		X	
Live Listen		X	
Noise App		X	
Mono Audio		X	
RTT and Software TTY		X	
Visible and Vibrating Alerts		X	
FaceTime		X	
iMessage		X	
Closed Captions		X	
Voice Control			X
Switch Control			X
Platform Switching			X
Assistive Touch			X
Touch Accommodations			X
Keyboard Shortcuts			X
Predictive Texts			X
Hardware Keyboard Support			X

Visual Features

Apple provides eleven accessibility features on its iOS device for those who are blind or have low vision. A brief description of each follows.

Siri

The easiest way for residents to interact with technology is to operate their smart devices by voice command rather than typing in a command on a smartphone or table. By teaching them to use Siri, they will be able to easily make calls, manage alarms and timers, set medication reminders, listen to daily news aloud, or get answers to any questions.

VoiceOver

This is a screen reader that converts all text and images into spoken word in multiple languages and at any speed and pitch desired. This feature works with all iPhone apps and many third-party apps and is incredibly helpful for residents with a wide range of vision impairments allowing them to more easily operate their smart devices.

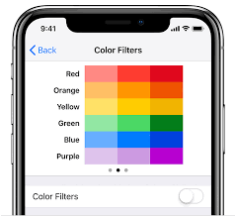
Audio Descriptions

This feature allows residents to hear a description for all images, video, subtitle tracks and closed captioning that appears on a smartphone, as long as the content has been designed around accessibility guidelines. And with VoiceOver, closed captions and subtitle tracks can also be accessed through Braille displays.

Dark Mode

This feature inverts background and text colors to improve a resident's ability to read. Instead of dark text against a white background, the text appears in white against a dark background. This mode works for Apple mail, the Safari Reader and iPhone apps like calculators and calendars. This mode is also compatible with other accessibility settings for contrast and transparency.

Display Accommodations



This feature allows residents with color blindness to adjust tint, hue, and grayscales and apply filters to screen images that make them easier to see and interpret. A setting called Smart Invert Colors enables the command device to recognize media such as graphics and movies rendered in dark colors and automatically reverses colors with changing the image itself. Once setup, this function applies to anything that is displayed on the screen.

Zoom

This feature allows the resident to magnify anything that appears on the screen for a closer look. The image size increases from 100-1500 percent, has a picture-in-picture function and works on all onboard apps and any application that can be downloaded from the Apple App Store. The feature is compatible with VoiceOver so residents can hear anything that is zoomed into, as well.

Font Adjustments
This feature increases the text size for all onboard apps such as messages, notes, settings, contacts and calendars and many third-party apps while maintaining legibility of the display. This feature allows residents to bold text making the text easier to see in all compatible apps.

Magnifier


This feature uses the command device's camera and flash function to magnify anything it is focused on and makes even the smallest text legible. The feature also has several filters that can be applied to increase the differentiation of colors.

Seeing AI App (Audio Magnifier)
Microsoft's "Seeing AI App" uses a mobile device's camera to identify people, objects, money, colors and more and then audibly describes them to residents with low vision or vision loss.

Speak Screen
For residents who prefer to hear the content of email, iMessages, books, and apps instead of reading them, this feature reads aloud whatever appears on the screen. It can be operated manually with a top-to-bottom two-finger swipe gesture or turned on an automatically with a Siri voice command. The voice speaking rate and dialect can be customized.

Dictation
This feature allows residents to dictate an email, note or anything else that would otherwise be typed simply by clicking on a button and speaking in the command device's microphone. Once spoken, the feature automatically converts it into typed words and characters without the resident ever touching the device.

Accessibility Shortcuts
The shortcut feature allows a resident to create an on/off quick link for other accessibility tools and settings that can be accessed while using apps or reviewing web content without having to open the app itself.

For more information about Apple's vision accessibility features, visit:
https://www.apple.com/accessibilitiy/iphone/vision/

Hearing Features
Apple has ten accessibility features on its iOS devices for residents who are deaf or hard of hearing. A brief description of each follows.

iPhone and iPad Hearing Aids
This feature entails Bluetooth pairing of the iPhone and iPad with hearing aids that are designed to respond to Home button clicks on command devices to adjust sound quality settings for a variety of environmental conditions.

Live Listen

This feature pairs an iPhone with AirPods to help the resident hear more clearly through the phone's microphone. This feature may be particularly useful in common areas in the facility where it may be noisier making it difficult for the resident to hear others in a one-on-one conversation.

Noise App

Although this feature is not applicable to command device control of smart devices, it does contribute to overall well-being by monitoring and recording the sound decibel levels the resident encounters by identifying levels that are harmful to hearing.

Mono Audio

This feature is helpful to residents who are hard of hearing in one ear. The stereo headphones ensure that both right and left channels contain all the recorded sound, rather than just the content programmed for each side. This feature also allows volume levels to be adjusted for each channel independently from the other.

RTT and TTY Software

The Real Time Text (RTT) and the Text Telephone (TTY) features allow residents who are hard of hearing to use the telephone or a Braille display to type messages back and forth to one another in real-time instead of talking and listening. This feature also archives the call transcription in the phone app for later review.

Visible and Vibrating Alerts

This feature alerts residents to an incoming call, text, FaceTime call and calendar events through a flashing LED light display or vibration. A variety of patterns are available, and the resident can assign pictures to different callers.

Siri

The applicable Siri function for residents who are hard of hearing is the "Type to Siri" mode that allows them to ask a question or issue a smart device command by typing rather than speaking.

FaceTime

This feature provides a high-definition video-calling capability that has a frame rate fast enough to facilitate sign language communication between two or more individuals who are deaf or hard of hearing.

iMessage

This feature provides residents the ability to engage in text exchanges that include video, photo, and link attachments which support communication between all people and particularly those with hearing and speaking disabilities.

Closed Captions

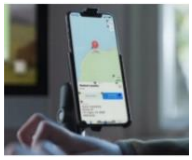
This feature allows residents to see captions and subtitles that track with the spoken word and sound in television broadcasts, movies, podcasts and in other media. Apple's VoiceOver feature, described above, translates closed captioned content for use with braille displays.

For more information about Apple's hearing accessibility features, visit: https://www.apple.com/accessibility/iphone/hearing/

Mobility Features

Apple has ten accessibility features on its iOS devices for those with mobility disabilities. A brief description of each follows.

Voice Control



This feature allows for voice control of all functions and apps on an iPhone or iPad. The feature also assigns numbered labels beside all clickable content that allows the resident to navigate any app and issue precise commands by voice alone.

Switch Control

This feature allows residents with a physical motor disability to navigate and control an iPhone or iPad and any connected Bluetooth-enabled switch on a smart device thought finger taps. This feature is paired with a tap strap device that attaches to each finder on one hand and sends a signal to the iOS device when it is tapped on the table. Each finger is assigned a different iOS device function (e.g., on, off, open, close, up, down, right, left) which responds to a tap. In this way, the resident can use an iPhone, iPad or any other iOS command device to control a smart device.

Platform Switching

This feature allows the resident to operate many devices synched to an Apple cloud account through just one device and is supported with the Switch Control feature describe above. Therefore, any other iOS device registered to the same resident can be operated through the same Switch Controlled device.

Siri

This feature is Apple's voice-activated digital assistant that can read and send text and email messages, turn on and off onboard apps and accessibility functions like Guided Access, Invert Colors and VoiceOver and answer practically any question a resident would like to ask. It is particularly helpful to residents who prefer to operate their smart devices by voice command rather than typing in a comment on a smartphone or tablet. Siri Shortcuts allows the resident to trigger the operating of several smart devices by speaking a customized command such as "leaving my room" which will turn off the lights, lock/unlock doors, etc.

Dictation

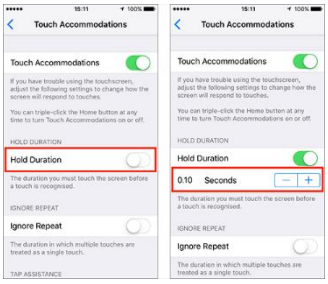
As stated above, this feature allows a resident to dictate an email, note or anything else that would otherwise be typed by clicking on a button and speaking into the command device's microphone. Once spoken, the feature automatically converts the input into typed words and characters with the resident never touching the device.

Assistive Touch

This feature allows a resident to customize the touch screen layout and touch gestures to make an iOS device easier to use. For example, if pressing the Home button is a challenge, the resident can reach the Home screen through a tap anywhere on the screen or by rotating or shaking the device. This feature also allows a resident to substitute a Bluetooth mouse in place of touch screen navigation and control.

Touch Accommodations

This feature allows a resident to change how the iOS device touch screen responds to touch commands. This feature can be particularly helpful when a resident may unintentionally tap the screen multiple times when trying to make a single selection and inadvertently triggers muliple screen responses. By adjusting the length of time, a single key must be pressed before the screen responds, shorter accidental taps are ignored and only the sustained touch receives a response.



Keyboard Shortcuts

This feature allows the resident to type shortcuts to reduce the length of typing required to execute a command. For instance, a shortcut can be created to type their resident address by typing RA. Shortcuts can be created for anything that is typed repeatedly.

Predictive Texts

This feature shortens the task of typing by predicting the words and phrases a resident intends to write from just the first letter or word typed. The feature learns commonly typed phrases and suggests them from these first few inputs to shorten the number of letters they must type.

Hardware Keyboard Support

This feature includes Stick Keys and Slow Keys. The first of these is designed to reduce movement associated with repetitive strain injury by serializing keyboard commands that

require holding down two or more keys at the same time. For example, a Microsoft Word print command requires the user to press the ctrl and V commands simultaneously which can be a challenge for some residents. By activating Sticky Keys, the resident can press each key in sequence to execute the print command. The Slow Key feature allows the resident to specify the amount of time required for a keypress before the system will recognize it as an intended keypress. This feature eliminates the challenge that accidental keyboard taps will register as intended keypresses.

For more information about Apple's accessibility features, visit:
https://www.apple.com/accessibility/phone/mobility

Android Accessibility Features

The Android operating system is designed primarily for touchscreen mobile devices such as smartphones and tables.

Android Accessibility Features-Apps

	Visual	Hearing	Mobility
TalkBack	X		
Braille Display	X		
Magnification	X		
Display Accommodations	X		
Magnification Gestures	X		
Font Adjustments	X		
Live Transcribe		X	
Live Caption		X	
Sound Amplifier		X	
Hearing Aid Support		X	
Switch Access			X
Voice Access			X

Visual Features

Android has six accessibility features on its devices for those with visual impairments. A brief description of each follows.

Talkback

This is Android's verison of the Applie VoiceOver feature that allows residents to navigate and control screen content through sound and touch. The feature uses screen reader software and adds haptic or vibration feedback to communicate device functions, options, notifications and alerts. It operates in the same way as the VoiceOver feature and has almost identical functionality.

Braille Display

This feature allows residents to make a Bluetooth connection between a refreshable Braille display and any Android device and when paired with TalkBack, to benefit from combined speech and tech communication.

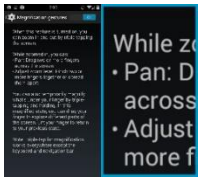
Magnification

This feature is like Apple's Magnifier as it uses the command device's camera and flash function to magnify anything it is focused on making even the smallest text legible. The feature also has several filters that can be applied to increase the differentiation in colors.

Display Accommodations

Like Apple's operating system, this feature allows residents with color blindness to adjust color, tint, hue, grayscales and apply filters to screen images that make them easier to see and interpret. Other Android accommodations include customizable display and font size and spacing.

Magnification Gestures



This feature is like Apple's Zoom, as it allows individuals to magnify anything that appears on the screen for a closer look. The feature also increases image size from 100 to 1500 percent and works on all onboard apps and any applications that can be downloaded from the Play store.

Font Adjustments

This feature increases the text size for all onboard apps such as messages, notes, settings, contacts and calendars and many third-party apps too while maintaining the legibility of the display. The feature also permits the resident to bold text making it easier to see in all compatible apps.

For more information about Android's vision accessibility features, visit: https://www.android.com/accessibility/

Hearing Features

Android has four accessibility features on its devices for those with hearing loss. A brief description of each follows.

Live Transcribe

This feature provides instantaneous captioning of anything that is spoken in 70 languages and dialects. It utilizes Google's speech recongition technology that can pick up subtle differences to produce accurate captioning of what is being spoken.

Live Caption

This feature automatically applies captions to videos, podcasts and any other media that is playing on an Android movile device like a smartphone or tablet.

Sound Amplifier

This feature pairs with earphones or wired headphones and significantly increases the folume and filters out background noise to improve a resident's ability to hear more clearly. Again, this feature is useful in common areas that may be noisier in the facility.

Hearing Aid Support

Like Apple, Google has partnered with hearing aid designers and manufacturers to improve their sound quality and functionality and enable them to receive streamed audio content from an Android device, such as phone calls, music or other media. This entails the use of a new Android smartphone operating protocol known as the Audio Streaming for Hearing Aide or "ASHA" specification. Regarding its relevance to command control over smart devices, this new protocol will allow individuals who use hearing aids to receive any streaming audio communication from a related app.

For more information about Android's hearing accessibility features, visit:
https://www.android.com/accessibility/

Mobility Features

Android has two accessibility features on its devices for those with mobility disabilities. A brief description of each follows.

Switch Access

This feature enables a resident to navigate and control an Android device through the use of an external switch device such as a joystick, touch pad, or tap strap (described above) instead of through the touchscreen or a conventional keyboard. This feature allows the resident to assign customizable actions to the external switch components so that all Android mobile functions and all companion apps are accessible, including smart device control apps.

To learn more, visit:
https://support.google.com/accessibility/android/answer/6122836?hl=en

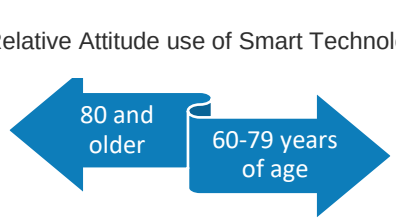
Voice Access

This feature assists residents with paralysis, tremors or temporary injuries, navigate and control their Android device, and their connected smart devices through voice command in place of a touch screen or keyborad. This feature is only available in English at the present time.

For more information about Android's mobility accessibility features, visit:
https://www.android.com/accessibility

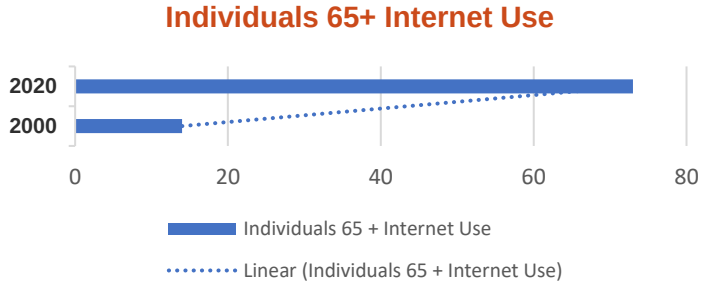
Influence of Age on Device Adoption

Our research and discussions with independent and assisted living care managers and staff, along with other supportive research literature, indicates that there are quite different attitudes and capabilities in the two age groups of those 60-79 years of age and those who are 80 and older, relative to The significant growth of the older segment of the population is coinciding with the growing number of independent and assisted living residential offerings. Older adults require well-designed, practical spaces to thrive in their residential environments. Such environmental design and practicality must integrate accessibility to and support of smart technology devices and programs. As people age, an inevitable experience of decrease in physical, cognitive, and sensory capabilities occurs. Will such losses fuel resistance, reluctance, and negativity toward smart technology programs and devices? Age differences are one determining and important factor in openness to and use of smart devices. the use of smart technology. Degrees of openness to smart technologies and willingness to use and embrace smart devices and programs are influenced and impacted by digital age divides: younger staff-older residents; younger staff-older staff; and younger residents in their sixties/seventies-older residents in their eighties/nineties/hundreds.



Some independent and assisted living residents would like to use smart devices but do not consider themselves knowledgeable or capable enough to achieve success. Our research and discussions with independent and assisted living care managers and staff provided insights reflecting that, typically, most residents below age 80 are willing to further their knowledge and use of smart devices and those over 80 frequently have little to no interest. Of course, residents are unique in their needs and preferences and, despite the digital age divide, we should not automatically assume that smart devices will be of interest or no interest based on solely age.

As highlighted in recent research studies, there's a widespread idea that older adults are technologically illiterate or dislike devices, but that's not necessarily the case. Instead, older adults adopt technologies they find useful and resist technologies they don't. Roughly 27 percent of Americans over 65 are not online and understanding why is key to changing that. If companies designed devices and software with value for older adults, not as many older people would find themselves on the other side of the digital divide.



According to the Pew Research Center, 73 percent of people over 65 in the U.S. were using the internet in 2020, as compared to only 14 percent in 2000. The older the person, the less likely they are to embrace the Internet, social media, or smartphones, but those who have adopted these technologies use them often and learn new skills to do so. Seniors are the fastest growing online demographic, though

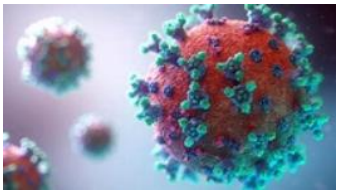
some remain holdouts. In many of those cases, the real barrier to entry isn't technological—it's personal. Older adults learn new technology skills when that technology has value to them. Many older adults have privacy concerns, and with good reason. Scams, fraud, and exploitation through a variety of technologies target older adults. While people of all ages worry about data privacy, those concerns prevent some older adults from using smart devices.

The people who drive technology development cannot know what it is like to be 80 or older, unless that is their actual age (which is highly unlikely) or they take the time to listen to, learn from, and involve older adults in design and decision-making. Consequently, misconceptions and stereotyping of aging influence design, build, and marketing of devices supposedly made for older adults. When they don't adopt smart devices, it's easy to write them off as resistant to technology. The assumption that they are "alienated" by technology ignores that older adults' resistance to technology is a value-based choice. Thus, many older adults resist some technologies and embrace others.

Without the intent to stereotype or project ageist views, it is important to recognize that, like older residents, older staff members may not be as adept or welcoming of smart devices for similar reasons as those mentioned earlier. For example, highly skilled and valued care staff who have been working in the field for many years are astute with measures such as charting notes on paper, as opposed to computers/tablets and prefer continuing with this approach. Older staff at more senior levels in their roles and responsibilities also tend to be burdened with more time-intensive intakes and discharges when required to use to technology for entering data and charting notes. And, as is the case with older residents, older staff are more prone to poor circulation (e.g., fingerprint logins may not register because of lower body temperature, which means added steps of logging in to computers or gaining entry into medicine storage spaces with smart locks) or small motor gripping and handling inabilities, prohibiting ease of device manipulation and use.

Applications to Mitigate COVID-19

Congregate residential settings serving older adults have proven to be the highest risk environments for complications and deaths from COVID-19. While national statistics are difficult to obtain, the Foundation for Research on Equal Opportunity estimates skilled nursing facilities/post-acute rehabilitation facilities and assisted livings account for 40% of COVID-19 deaths in 2020. While skilled nursing facility (SNF)/post-acute rehabilitation facilities have been exposed as the highest risk environments during the COVID-19 pandemic, independent and assisted livings have been taxed with similar complications and death tolls. While a gap exists in tracking data from independent livings, a growing body of literature on assisted livings and COVID-19 is emerging. Many assisted living residents have the chronic underlying conditions that are of heightened concern with COVID-19.



In July 2020, the U.S. House Committee on Oversight and Reform released the COVID-19 in Assisted Living Facilities Staff Report. Citing COVID-19 spikes in case rates and fatalities, a comprehensive survey was used to collect investigative data. Assisted living residents tested positive for COVID-19 at five times the overall national average rate with 1 in 4 residents. Nearly half of assisted living residents testing positive for COVID-19 were hospitalized and one-third died (six times the national average). The COVID-19 positivity rate among assisted living employees was almost four times the national average. Independent and assisted living care managers faced challenges of inadequate sick leave policies, lack of accessible/available testing, inadequate testing protocols, and shortages of personal protective equipment (PPE). All of these challenges heightened employee and resident risks for more individual case occurrences and outbreaks and other significant physical, mental, emotional, psychological, and financial hardships.

Applications of smart devices can mitigate some of the challenges brought about by the COVID-19 pandemic. These devices can increase safety, security, convenience, and comfort, while also minimizing resident loneliness and social isolation and support human connectedness as our society works to transition in reestablishing a sense of normalcy.

Resident Challenges

- Visitor restrictions and inability to safely facilitate in-person contact between residents and their families, friends, and others
- Discouraged or prohibited outings with family and friends and within the community
- Lack of group transportation options for grocery store trips, errands, medical appointments, social outings, and more because shuttles could not operate under COVID-19 tier restrictions
- Increased social isolation, especially during colder weather months when visits or meals cannot be comfortably accommodated outdoors
- Prevalence of chronic underlying conditions (e.g., heart disease, diabetes, hypertension, lung disease) that are of heightened concern and associated risk with COVID-19

- Missed or delayed appointments with medical care providers for routine health and wellness exams, preventative care, and elective procedures

- Increased risk and occurrence of scams and exploitation of residents; during the COVID-19 pandemic, more spam calls, solicitation texts and emails, and social media invitations from disguised predators who are preying on the vulnerabilities and isolation of older adults

- Cancellation or format changes to in-person group fitness classes, education and enrichment classes, and social/recreational gatherings; consequently, deteriorating physical and mental health and increasing loneliness and isolation

Staff Challenges

- Logistics of tracking, documentation, and reporting related to COVID-19

- Staff work overload, fatigue, vicarious trauma, and burnout

- Overload of Wi-Fi signal strength and speed, impacted in part by the increase in smart device users during the COVID-19 pandemic

- With the increase in more online health (e.g., telehealth appointments), wellness (e.g., online fitness classes), and socialization (e.g., virtual family gatherings) offerings, staff are short on personnel and time to provide facilitation, education, and support for residents

Mitigation Applications

Maintaining and facilitating human connectedness during the pandemic led the perceived advantages of smart device use among those interviewed during this research initiative. With too many risks involved with in-person connections, virtual connectedness is seen as the next best option. Electronic check-ins between and among staff and residents and video calls between residents and families or between staff and family caregivers were all identified as advantages.

Improved mental health and well-being was cited as a quality-of-life enhancement that smart devices could influence. For example, residents and staff are challenged by heightened levels of isolation and fewer opportunities for socialization. Connectedness through smart devices could fill some of the natural and COVID-19-induced voids of human contact. As telehealth has increased in popularity, especially during the COVID-19 pandemic, smart devices have influenced the convenience of remote appointments between residents and medical providers and between personnel and family members for care planning conferences.

Communication is key in fostering a sense of connectedness. Electronic smart boards are advantageous in alerting residents about updates and online or socially distanced events in communal areas. Smart phones and tablets have increased in use for video communication

platforms and for social connectedness of photo/video sharing and other types of contacts with family members.

Awareness of current events provides a means for social connectedness. With the increase in online news and social media consumption among residents who use smart devices, residents have increased awareness and knowledge of current events. Subsequently, some residents feel a greater connectedness to the outside world at a time when they have been more physically and socially isolated due to the COVID-19 pandemic. The COVID-19 pandemic has influenced more first-time or increased use of online browsing, usage of social media (i.e., Facebook), gaming (i.e., Farmville), and Zoom or Skype video chats with family members and friends. Televisions in some facilities are smart TVs and facility personnel and residents have expanded use of smart television add-ons, such as Roku, Firestick, Netflix apps, and other video streaming.

Application of Smart Devices

This section contains sample listings, descriptions and pricing for some of the more popular smart devices by the applications discussed in this guide. Categorized by application, examples of smart devices and their functions and price ranges are included. Categories of devices include: Communication Devices; Social Media and Video Conferencing Apps, Monitoring Devices, Hazard Detection Devices; Smart Appliances; and Device and System Controllers.

Essential Resident Connection Devices

Communication Devices		
Name	**Features**	**Price Range**
The GandPad	Simple and secure tablet computer that connects a senior to their family and friends. Able to view photos and videos, play games, listen to music, check emails, make phone calls, place a video chat, etc.	Free table and case with subscription; Plans: $79/month with $29 Setup and Shipping or $696 per year if paid up front with free Setup and Shipping
ViewClix	Easy use and allows for family members with on-the- go lifestyles to stay connected. Can easily share pictures, enjoy live video calls, and post sticky notes to the ViewClix Frame.	$200 - $300 depending on screen size
FaceBook Portal	Uses FaceBook Messenger or WhatsApp to make calls. The smart camera automatically pans and zooms keeping everyone in frame while you move and talk freely. Smart sound enhances your voice while minimizing unwanted background noise	$129 - $279
Amazon Echo Show	Allows calls to others who have the Alexa app or an Echo device with a screen. Works similar to a Google Nest Hub.	$45 - $155

Social Media &Video Conferencing Apps		
Name	**Features**	**Price Range**
Online Social Networking Services	Online platforms used to build social networks or relationships with other people who share similar interests. Examples of platforms include: • FaceBook • https://www.facebook.com/ • Instagram https://www.instagram.com/ • Tumblr https://www.tumblr.com/ • AARP Online Community https://community.aarp.org/	Free
Senior Chatrooms	This makes chat with others much easier and accessible to seniors. The site design is easy on the eyes and easy to navigate. Examples of chat rooms available specifically for seniors include: • Silversurfers https://www.silversurfers.com/silversurfers-forum/ • Buzz50 https://www.buzz50.com/ • ElderCare Online Chat http://www.ec-online.net/Community/chatschedule.htm • FaceBook Messenger https://www.messenger.com/	Free
Video Conferencing	Offers a great way to keep in touch while keeping a safe distance during the COVID pandemic. Video conferencing feels more personal than a phone call and with the right platform, it can almost feel like the participants of a video call are in the same room. Easy-to-use platforms for seniors include: • Zoom https://zoom.us/ • Skype https://www.skype.com/en/ • FaceTime An app that supports video and audio calling between Apple devices • Google Hangouts https://hangouts.google.com/ Compatibility with platforms vary by the command device that is used.	Free

Smart TV Add-Ons and Apps:

- Roku: https://www.roku.com/
- Fire TV Stick with Alexa Voice Remote (includes TV controls) | HD streaming https://www.amazon.com/fire-tv-stick-with-alexa-voice-remote/dp/B07ZZVX1F2
- Netflix: https://www.netflix.com/
- Hulu: https://www.hulu.com/welcome?orig_referrer=https%3A%2F%2Fwww.google.com%2F

Smart Location Apps

- Find My Friends by Apple https://apps.apple.com/us/app/find-my-friends/id466122094
- Life360 https://www.life360.com/

Smart Cameras & Monitors		
Name	**Features**	**Price Range**
Amazon Cloud Security Cam	Captures video surveillance of home when away. Gives notifications of activity through a mobile app or website. Provides the viewer with two-way audio.	$115 - $125
GE Wireless Digital Camera	Provides Wi-Fi activated smart security monitoring for indoor or outdoor the home. Connects to other Wi-Fi enabled devices such as a smartphone to provide video surveillance.	$80 - $125
Piper nv Smart Home Security System with Night Vision	Video home security system that sends alerts to a smartphone when there is unsuspecting motion or activity.	$195 - $205

Smart Doorbells		
Name	**Features**	**Price Range**
Nest Hello Doorbell Camera	Doorbell camera to view and interact with visitors at the door. Can view and talk to people from your smartphone or other device.	$225 - $235
Ring Video Doorbell	Connects with Alexa and smartphone or tablet for Wi-Fi activated security. Has a camera to hear, speak to, or see anyone at the front door.	$95 - $500

Smart Occupancy Sensors		
Name	**Features**	**Price Range**
BeSense Zwave Ceiling PIR Motion Detector	Ceiling motion detector alerts connected technologies when someone is in the home. Connects to smart hubs to activate programmed home controls such as lighting and temperature.	$25 - $30
Nest Tag	Touch the device to disarm your Nest-connected alarm system to alert the home of occupancy.	$20 - $30
Philips Hue Motion Sensor	Wall mounted or freestanding device which controls lighting when someone walks into or leaves a room.	$35 - $45
Samsung SmartThings Arrival Sensor	Receive an alert to your smart device when someone arrives at or leaves your home. This device can also be programmed to trigger lights or locks when a person arrives at or leaves the home.	$15 - $20
Wink Door Window Sensor	Alerts your Wink Hub if doors and windows are opened, notifying the user through the Wink App if anyone has entered the home.	$25 - $35

Smart Emergency Alert Devices		
Name	**Features**	**Price Range**
Medical Guardian	This medical alert device can detect falls and pinpoint location to expedite help. It can be worn as a pendant or wristband. Offers six different products and plans that can be selected and customized.	Equipment: $0 - $300; Plans: $30 - $60/month
ADT	Includes medical protection at home or on the go. It can be worn as a pendant or wristband. Includes a fall detection feature that can get help even if the emergency button can't be pushed. Three plan options are available that include GPS location, home temperature monitoring, and 2-way talk with ADT through a base unit. An ADT lockbox to house a door key can be purchased for $30 to allow for easy access for emergency personnel.	Equipment: $0 - $15 Plans: $30 - $40/month
MobileHelp	Six options and plans are available that range from the basic to an in-home connection hub. May be worn as a pendant or wristband. Medical alert features include medication reminders, fall button options, monitoring services, two-way voice	Plans: $20 - $300/month
Medical Alert	Plans vary from a basic, affordable system to an On- the-Go + flexible system that offers GPS with location-based services	Plans: $20 - $43/month

Smart Health Monitoring Devices		
Name	**Features**	**Price Range**
Apple Watch Series	Depending on the series, smart watches are offered with a variety of features in different price ranges. Options include monitoring Sp02 levels, heart rate, sleep patterns, and fitness. Includes motivation reminders and the ability to set up activity competitions with friends. With Fitness+, able to work out with fitness trainers that produce metrics to send to an iPhone, iPad, and/or Apple TV. With an ECG app, capable of generating an ECG similar to a single-lead electrocardiogram. Can generate and receive calls and texts.	Prices start at $399
Coco Watch BT1	Monitors blood oxygen, Sp02 levels, body temperature, heart rate, and sleep pattern. When anomaly is detected, alerts are sent to a care provider or family member. Includes a senior friendly interface that offers medication reminders and fitness trackers. Additional subscriptions available for advanced features such as Geo-Fencing and multiple emergency contacts.	$99.00
Zepp E Circle Smart Watch Health & Fitness Tracker	Tracks fitness and monitors Sp02 levels and sleep patterns. Notifications are sent to the wearer if the heart rate exceeds a recommended limit. Incoming calls, emails, messages, etc. can be received without having a phone. Sedentary reminders are sent if the wearer sits for too long.	$220.00
Amazfit GTR 2 Smartwatch	Includes 3GB music storage and GPS. Monitors heart rate, sleep quality, stress level, and Sp02. Also includes the PAI health assessment system that uses algorithms to convert all complex health and activity data into a single score to help the wearer understand their physical state at a glance.	$180.00
The MedMinder Medication Dispenser	MedMinder makes it easier for individuals to take their medications in the right amount and at the right time. With visual, audio and phone alerts, reminders are given. And, notifications are sent if a dosage is missed. MedMinder is the only pill dispenser with Medical Alert, daily weather forecast and the ability to upload family pictures.	$49.99

Hazard Detection Devices

Smart Smoke & Carbon Monoxide Detectors		
Name	**Features**	**Price Range**
Honeywell Xiaomi Mijia Alarm	Provides remote alerts to connected technologies and smartphones when smoke is detected in the home.	$30 - $40
First Alert Onelink Safe & Sound Smart Hardwired Smoke & Carbon Monoxide Alarm	Alerts smart device through the Onelink app if there is a detection of smoke or carbon monoxide in the air. Has a built-in Amazon Alexa.	$245 - $255
Leeo Smart Alert Smoke/Carbon Monoxide Remote Alarm	Monitors existing smoke, carbon monoxide, and water alarms and alerts you via smartphone app or phone call if there are issues. Can alert friends, family, and local emergency services of emergency detections.	$95 - $105
Nest Protect Smoke and Carbon Monoxide Alarm Battery	Connects through Wi-Fi to Smart Home Technologies to alert user of smoke and/or carbon monoxide in the air.	$115 - $125
Samsung SmartThings ADT Smoke Alarm	Alerts connect technologies when there are smoke or high temperatures. Has the option of connecting with ADT services and professional monitoring. Requires use of an ADT Security Hub.	$70 - $80

Smart Leak Detectors		
Name	**Features**	**Price Range**
Flo Leak Detection System	Provides remote automatic water shutoff through a smart phone app, gives alerts to a smartphone when maintenance is needed and performs daily tests to detect leaks and identify issues.	$490 - $500
Floodie	Sends immediate alerts to a smart phone when the device detects leakage or floods.	$85 - $95
Honeywell Lyric Wi-Fi Water Leak Detector	Alerts smartphone when the device detects a water leak or freeze. Connects to home Wi-Fi.	$65 - $85
Samsung SmartThings Water Leak Sensor	Alerts smartphone when device detects excess water.	$20 - $30
Wasserstein Smart Wi-Fi Water Sensor	Alerts smartphone when there is a present or potential water leak in a home. Connects to home Wi-Fi and provides information via the Wasserstein app on smartphones.	$25 - $55

Smart Air Quality Sensors/Smart Air Purifiers		
Name	**Features**	**Price Range**
Awair Air Quality Monitor	Monitors home air composition by tracking toxins, dust, and chemicals. Connects to home technologies such as Nest, Alexa, smartphones, and tablets to provide information feedback.	$160 - $170
Flowie Waterflow Sensor	Connects to water meter to detect water use as well as air quality and humidity.	$390 - $400
Foobot Air Quality Monitor	Sends data to a smartphone or tablet about home air quality. Uses colored LED lights to show the user what the air temperature, humidity, and purity is like. Connects with other Smart Home Technologies such as Nest and Amazon Echo.	$195 - $205
Levoit Air Purifier and Sensor	Levoit purifies the air by ridding home air of toxins, dust, and other particles. The device provides smart feedback by suggesting specific use of fan speed to keep air cleaner. The device has a sleep mode to adjust the purifier to the needs of the user at night.	$85 - $160
Wynd Wearable Air Quality Tracker	This wearable and portable technology connects to a mobile app on smartphone or tablet to monitor air quality anywhere you go. Through the app, it provides information on the level of particles in the environment such as allergens and fuels.	$75 - $80

Smart Appliances

Refrigerators, Washers, Dryers, Ovens, Air Purifiers		
Name	**Features**	**Price Range**
Behmor Smart Coffee Maker	Remote control of your coffee maker via smartphone or device. Connects with Amazon Alexa and Amazon Dash.	$165 - 175
Kenmore Smart Dryer	Remote control of your dryer via smartphone or device.	$985 - $1,150
LG InstaView Door in Door	Voice activation through Google Assistant, gives notifications of open door for energy efficiency.	$1,895 - $2,695
Samsung Flex Duo Smart Oven	Control and monitor cooking activities through Wi- Fi connectivity.	$2,195 - $2,395
Samsung High Efficiency front-load washer	Remote control of your washer through Wi-Fi connectivity.	$995 - $1,045
GE Profile 30" Smart Slide-In Front-Control Induction and Convection Range with No Preheat Air Fry	Built-in WiFi will start, stop and monitor your laundry from anywhere while receiving real-time notifications and updates; syncs with smart dryer companion; SmartDispense technology saves time and has smart dispenser that holds up to 32 loads of detergent and automatically dispenses the right amount each time.	$1079
GE Appliances Smart 5 cu. ft. Energy Star High-Efficiency Front Load Washer	Built-in WiFi will start, stop and monitor your laundry from anywhere while receiving real-time notifications and updates; syncs with smart dryer companion; SmartDispense technology saves time and has smart dispenser that holds up to 32 loads of detergent and automatically dispenses the right amount each time.	$989
Levoit Smart Wi-Fi Air Purifier	Can be controlled remotely, set schedules, adjust fan speeds, etc. from your smart phone. Compatible with Amazon Alexa and Google Assistant for voice control.	$139.98
Lenovo Smart Clock	Lenovo Smart Clock with the Google Assistant sets screen brightness to gently increase in morning. Sets up a morning routine to bring local traffic, news, weather, and sports automatically.	$79.99

Smart Door Locks		
Name	**Features**	**Price Range**
August Wi-Fi Smart Lock	Includes an open-close sensor. Works with Siri, Google Assistant, and Alexa. Wi-Fi enables remote access to lock and unlock a door from an Android or iOS device from a remote location	$220 - $250
Yale SL Touchscreen Deadbolt	Includes a keyless lock with a backlit keypad that works with Amazon, Alexa, Google Assistant, and HomeKit. A version is available that connects to other smart devices.	$260 - $300
Kwikset Halo Wi-Fi Smart Lock	Can create up to 250 unique user codes for friends, family, or guests that can quickly and easily be disabled or deleted. Notifications can be sent related to a lock's activity and lock event history. Works with Alexa and Google Assistant and compatible with the Kwikset App	$170 - $230
Schlage Encode Smart Wi-Fi Deadbolt	Built-in Wi-Fi allows you to lock/unlock from anywhere. Pair with the Schlage Home app or Key by Amazon app to create and manage up to 100 access codes for family, friends, and care providers. Works with Alexa. Built-in alarm technology senses potential security breaches at the lock.	$220 - $250

Smart Plugs		
Name	**Features**	**Price Range**
Belkin Smart plug	Connects with Alexa and Google assistant to provide remote control of technologies.	$25 - $35
Geeni Spot Smart Plug – Single plug	Control technologies through Google Assistant, Amazon Alexa, voice control, or through Wi-Fi connectivity to smart device.	$15 - $25
Kisslink Mini Smart Plug Mini	Connects with Alexa, iOS, and Android to provide remote control of Smart Home Technologies via smartphone or device.	$10 - $25
Mini Smart plug (Amazon)	Connects with Alexa and Google Smart home.	$10 - $20
youxiu smart plug (Amazon)	Connects with Alexa, iOS, and Android to provide remote control of Smart Home Technologies via smartphone or device.	$10 - $20

Smart Thermostats		
Name	**Features**	**Price Range**
Honeywell	Adjust temperature from a remote location via computer, tablet, or smartphone; creates energy savings, touchscreen, large panel visual, connects to Amazon Alexa for voice control.	$95 - $210
Lux GEO	Use with or without Wi-Fi, 7-day programming, air filter monitor, and large backlit display.	$95 - $160
Nest Thermostat	Adjusts temperature based on personal habits, large, clear display; efficient temperature control; connects to Amazon Alexa for voice control.	$205 - $250
Sensi Touch Wi- Fi Thermostat	Smart alerts, automatic upgrades, color shift, back glow, humidity readings, brightness adjust, easy do-it-yourself installation, and a seamless smart home integration.	$145 - $170
Bosch Connected Control	Weather access, 5" full-color touch screen, compatible with most HVAC systems, programmable.	$160 - $170
Ecobee Smart Thermostat	Energy Star approved, alerts for sudden temperature changes, vacation mode to conserve energy, control heating and cooling from the app and with voice command, intercom-style announcements, playlist and podcast listening on thermostat with Bluetooth speaker streaming, offers eco+, a free software upgrade for Ecobee thermostats to enhance energy saving options	$169 - $249

Smart Lighting & Dimmer Controls		
Name	**Features**	**Price Range**
Cree LED Lightbulb – 4 pack	When connected to a hub, can turn on, off, and dim from remote locations via connection.	$15 - $20
LIFX Mini Wi-Fi Smart LED Light Bulb – 1 pack	Connects to compatible technologies (Alexa, Android, iOS) to allow for remote control of lighting, dimming, and timing of lights.	$20 - $40
Lutron Caseta Wireless Smart Lighting Dimmer Switch – 2 pack	Connects to compatible technologies (Alexa, Android, iOS) to allow for remote control of dimming and usage of lighting.	$155 - $190
GE C-Sleep Lightbulb – 4 pack	Connects with Amazon Alexa or Google Assistant to control lighting from remote locations. Ability to group bulbs to control many at once. No hub required.	$65 - $75
Philips Hue – 4 pack	Automated light control from home or away via app, or other Smart Technology such as Echo or Nest.	$175 - $200

Smart Hubs & Device Controllers		
Name	**Features**	**Price Range**
Iris Smart Hub	This Smart Hub is the heart of the Iris Network and allows control of your connected technologies using the Iris app.	$65 - $75
Logitech Harmony Hub	The Logitech Harmony Hub connects with over 270,000 entertainment and smart home technologies. You will have the ability to control the Harmony Hub by using your smartphone or tablet.	$70 - $100
Phillips Hue Bridge (2nd Generation)	Control lighting, adjust thermostat, or lock doors via voice commands.	$50 - $60
Samsung SmartThings Hub	Connects a variety of Smart Home Technologies, compatible on App, connects with Echo, learns household behaviors by monitoring technologies at all times.	$80 - $90
Wink Connected Home Hub	Connects multiple Smart Home Technologies, sets patterns and connects technologies in the house; allows for easy control via Wink App.	$25 - $35

Smart Home Assistants		
Name	**Features**	**Price Range**
Amazon Echo	Responds to voice commands to control other home technologies and complete tasks such as report the weather, play music, and create calendar events.	$45 - $230
Apple Home Pod	Plays music by adapting to the speaker's and user's environment. Also acts as a home assistant through the voice detecting use of Siri to answer questions and complete tasks	$295 - $350
Google Home Assistant	Responds to voice commands to control other home technologies and complete tasks such as report the weather, play music, and create calendar events.	$45 - $130
Insignia Voice	Voice activation plays songs for the user. Pairs to other technologies through Wi-Fi and Bluetooth. The device has a built-in Google Assistant to answer questions and access the Internet.	$45 - $55
Ultimate Ears	Voice activation plays songs for the user. The device has a built-in Amazon Alexa to answer questions and complete tasks with Wi-Fi connectivity.	$190 - $250

Smart In-Home Displays		
Name	**Features**	**Price Range**
Cevia's Homeview	This Wi-Fi connected 8-inch display allows for instant home energy updates. Receive not only photos from anywhere in the world, but also alerts and messages from your utility. Homeview can monitor and control a wide variety of Smart Technology.	$140 - $160
CURB Home Energy Monitoring System	Home energy monitoring system that attaches to a breaker panel to show individual appliance energy consumption. Communicates to the resident through iOS or android technologies to give updates on usage and projected costs.	$395 - $405
Neurio	Home energy monitoring system that provides cost updates and notifications to a smartphone or device to better understand home energy usage and areas for savings.	$215 - $225
TED Pro Home Electricity Monitor	Monitors electricity usage in the home and communicates with resident and utility company on high areas of usage and ways to cut monthly bills. Compatible with smartphones and Alexa.	$295 - $500
Sense Home Smart Meter	Device that installs into home electrical panel that monitors power usage. Sends notifications to a smartphone or device about usage monitoring and changes. The device learns patterns in energy use to maximize efficiency while lowering cost.	$295 - $350
Smappee	Smappee is an appliance-focused meter that monitors energy usage from technologies such as a heat pump or electric car. Via smart phone or device, Smappee provides the user with information on energy usage per individual technologies and factors. It provides alerts if there are leaks or errors in energy usage to create cost savings.	$245 - $350

Assistive Technology Devices		
Name	**Features**	**Price Range**
Sip and Puff Switch	Can be used to access all switch activated devices - speech generating devices, computers, tablets, mobile phones, environmental control systems, and other devices designed for switch scanning.	$295
HeadMouse Nano - Wireless Head Controlled Access	HeadMouse replaces the standard computer mouse for people who cannot use or have limited use of their hands. The HeadMouse translates natural movements of a user's head into directly proportional mouse pointer movement – move your head and the mouse pointer follows along. The HeadMouse has a wireless optical sensor which tracks a tiny disposable target worn by the user on their forehead, glasses, or even a hat. It works just like a computer mouse, with the mouse pointer being controlled by head movement.	$995
Sammons Preston - 40423 Mouth Stick Wand, 14" Long Typing Stick & Page Turner for Computers & Electronic Devices, Assistive Technology Interaction Aids	Mouth stick for those with limited reach and mobility who are unable to use their hands for typing and page turning. One-ounce mouth wand is easy to bite and control with your teeth and mouth, ergonomic design makes it easy and comfortable to maneuver. Sturdy and non-bendable mouth sticks are durable enough to last a long time and are for multipurpose, daily use. Enables and recognizes touch interactions with buttons by applying appropriate pressure without bending to register a click. Typing and interacting solutions for individuals who need assistance turning the pages of books, pressing buttons, or typing on a computer keyboard.	$67
I-Series by tobii dynavox	Eye tracker with a sensor technology that makes it possible for a computer or other device to know where a person is looking. An eye tracker can detect the presence, attention and focus of the user. It allows for unique insights into human behavior and facilitates natural user interfaces in a broad range of devices. The ability to control a computer using the eyes is also vital for people who are unable to speak or use their hands.	Prices available through quotes
IK Multimedia Tablet Page Turner Bundle	Includes Wireless Page Turner and Microphone Stand Mount and includes iKlip Expand universal tablet mount for microphone and music stands. Includes iRig Blue Turn wireless page turner for iPhone, iPad, Android and Mac.	$99
Mouse4all Switch	An app which allows everyone to use an Android tablet or smartphone entirely, without touching the screen. It enables access to the Internet, social networks, games or any other app. Can be used with switches, Bluetooth wireless, or cable.	in app purchase

Additional Resources

To support further exploration into the use of smart devices, this section provides: a listing of related consumer guides currently available on the Smart Self Reliance website (www.smartselfreliance.org); do-it-yourself instructional videos on smart device installation; guidance on communicating the value and operation of smart devices to residents; and links to other organizations with resources that can support care providers.

Available Consumer Guides

- **Smart Devices & Services for Independent Living**
  https://smartselfreliance.org/wp-content/uploads/2020/10/Indep.-Living-Guide-Final-10.28.20.pdf
  This Guide describes how smart devices and utility pricing programs enhance independent living for people with a range of disabilities.

- **Consumer Guide to Aging in Place: Smart Technology and Services**
  https://smartselfreliance.org/wp-content/uploads/2019/12/Consumer-Guide-to-Aging-in-Place-Smart-Technology-and-Services.pdf
  An easy-to-read Guide describing how smart devices can enhance anyone's safety, security, comfort and convenience while reducing their utility costs.

- **Care Provider's Guide to Smart Home Devices & Services**
  https://smartselfreliance.org/wp-content/uploads/2020/09/Care-Providers-Guide-to-Smart-Devices-%5E0-Services-v12.1.19-2.pdf
  This Guide describes how existing smart devices can be employed to assist family members and professional care providers who are caring for older adults with cognitive (mild cognitive impairment, dementia), sensory (blind, deaf), or physical (mobility) challenges.

Instructional Videos

The 10 to 15 minute self-install instructional videos describe the purpose, function and features of each device and provide step-by-step instruction on the initial set-up, online activation and use of the companion app. The videos also describe the device's accessibility settings, safety and maintenance. and troubleshooting.

- Personal Assistant
  Google Home Mini
  https://store.google.com/us/product/google_nest_mini

- Smart Light Bulb
  Wyze Smart Light Bulb
  https://wyze.com/wyze-bulb.html

- Smart Plug
  TP-Link Kasa Smart Wi-Fi Plug (HS100)
  https://www.amazon.com/dp/B0178IC734?tag=digitren08-20&linkCode=ogi&th=1&psc=1&ascsubtag=1583857523291ffuh

- Smart Doorbell
  Ring Video Doorbell with HD Video, Motion Activated Alerts
  https://www.amazon.com/Ring-Wi-Fi-Enabled-Doorbell-Nickel/dp/B00N2ZDXW2

- Smart Smoke & Carbon Monoxide Monitors
  Roost Wi-Fi battery for smoke and CO alarms
  https://shop.getroost.com/collections/homepage/products/roost-smart-battery

- Smart Thermostat
  Nest Thermostat E
  https://nest.com/

- Indoor Air Quality Monitor and Air Purifier Outlet
  Awair Glow C Air Quality Monitor + Integrated Smart Plug
  https://www.amazon.com/s?k=Awair+Glow+C&i=amazon-devices&ref=nb_sb_noss_2

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Smart Device Instruction

As care managers and care staff, you may be responsible for instructing residents on smart device set-up and use. Below are a few tips on effectively communicating smart device instruction to the residents.

Tip #1. Explain the Value

Explain the relevance of the device, for example, show the resident how easy it is to enhance their social life and connections without leaving their room. Create “wow” moments such as connecting with a family member or close friend.

Tip #2. Use Easy Language

Be careful with word choices and avoid technical language. The language is familiar to you but will not make sense to someone with no experience with the technology use. Build on existing knowledge by asking what they already know about the technology and start from there.

Tip #3. Take it Slow

Watch your pace and don’t move too quickly. Establish the big picture first and then go into greater detail as it is apparent that the former is understood. Pause between each step to give them a moment to process the information that they just learned. Allow plenty time for plenty of questions as the more engaged they are, the more likely they will understand and retain the information.

Tip #4. Repeat Key Concepts

The amount of information you give them can be overwhelming. Repeating key concepts will be helpful for their comprehension and retention of the information.

Tip #5. Write it Down

As you describe the steps for device operation, if possible, have the resident write them down. If they get lost or forget how to do something after you leave, they can jog their memory from the instructions written in their own handwriting.

Tip #6. Give Them Confidence

Validate their expressions of confusion and perhaps frustration but reinforce that the can and will learn. Reinforce that learning something new can be challenging and difficult in the beginning, but with practice, it will become much easier. Once instruction is complete, have them practice using the device and explain the steps back to you. Celebrate the small victories and praise the positives.

Tip #7. Share Resources

Share additional resources that give free technology tutorials such as Techboomers. Visit the website together and bookmark it so they have easy access.

Tip #8. Get Them Used to Technology

A great way to learn technology is to become engaged through games such as crossword puzzles, Sudoku or video games. Download the app and provide instruction on how to play from their device. This will allow them to become comfortable with using buttons and touching the screen.

Care Provider Resources

- AARP Personal Technology https://www.aarp.org/home-family/personal-technology/?intcmp=GLBNAV-SL-HF-TECH
- AARP Staying Sharp https://stayingsharp.aarp.org/?intcmp=GLBNAV-PL-STSH-SS
- Christopher & Dana Reeve Foundation https://www.christopherreeve.org/
- Christopher & Dana Reeve Foundation: Health https://www.christopherreeve.org/living-with-paralysis/health
- Christopher & Dana Reeve Foundation: Cost and Insurance https://www.christopherreeve.org/living-with-paralysis/costs-and-insurance
- Christopher & Dana Reeve Foundation: Rehabilitation https://www.christopherreeve.org/living-with-paralysis/rehabilitation
- Christopher & Dana Reeve Foundation: Home and Travel https://www.christopherreeve.org/living-with-paralysis/home-travel
- Christopher & Dana Reeve Foundation: Wheelchairs https://www.christopherreeve.org/living-with-paralysis/wheelchairs
- Christopher & Dana Reeve Foundation: For Caregivers https://www.christopherreeve.org/living-with-paralysis/for-caregivers
- Illinois Assistive Technology Program (IATP) https://iltech.org/
- Smart Self Reliance https://smartselfreliance.org/
- TechBoomers https://technoomers.com

Sponsors & Authors

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