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Research on Technology Supporting Aging in Place

Retired people living in Senior Housing (SH) and Senior Living (SL) facilities dread the thought of moving from place to place in order to receive increasingly medicalized care as their physical condition deteriorates over their final years. To minimize this potential, as well as to keep residents longer, SH and SL facilities are providing a greater range of services that meet a wider variety of senior needs. One such example is the use of home health services in an SH or SL facility, which can prevent or delay the transfer of a resident into a nursing care facility.

Another trend is the use of technology that supports aging in place. These hardware and software products aid senior residents, their family members and significant others, medical personnel, and facility management and staff. Some products are designed to integrate these specialized technologies so that seniors can control all the devices in their room from one console, or facility management can simultaneously monitor either the operations of the entire facility or the welfare of residents in real time. All of them redound to the benefit of the senior residents themselves. Finally, still other technology products aid facility marketing and promotion.

According to research findings published by the Pew Research Center's Innovation & Technology division, the time for specialized technology products for seniors has arrived. Although seniors consistently have lower rates of technology adoption than the general public, this group is more digitally connected than ever. In fact, some groups of seniors, such as those who are younger, more affluent and more highly educated, report owning and using various technologies at rates similar to adults under the age of 65.

As a case in point, four in ten seniors now own smartphones, more than double the share that did so in 2013. With smartphone ownership in the U.S. more than doubling in the past five years, Americans are embracing mobile technology at a rapid pace. And while adoption rates among seniors continue to trail those of the overall population, the share of adults ages 65 and up who own smartphones has risen 24 percentage points (from 18% to 42%) since 2013. Today, roughly half of older adults who own cellphones have some type of smartphone; in 2013, that share was just 23%.

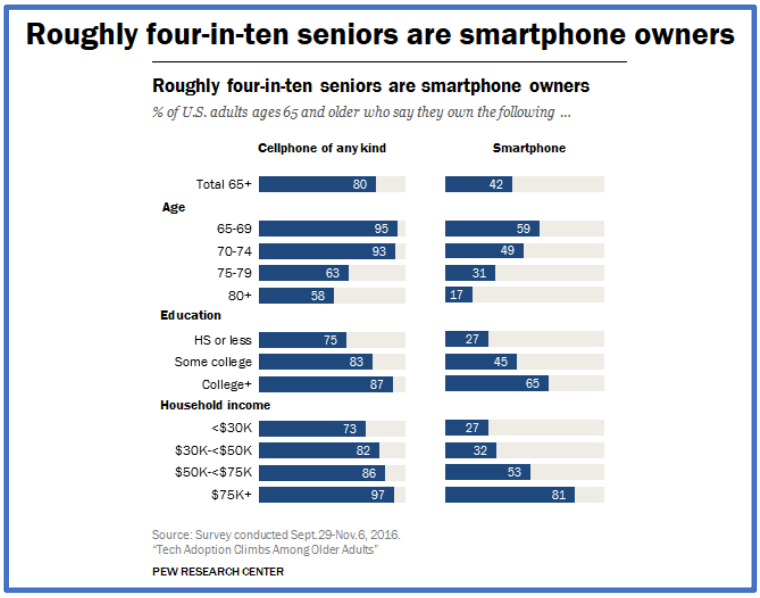
Smartphone ownership among seniors varies substantially by age: 59% of 65- to 69-year-olds own smartphones, but that share falls to 49% among 70- to 74-year-olds. Smartphone adoption drops off considerably among adults in their mid-70s and beyond. Some 31% of 75- to 79-year-olds say they own smartphones, while only 17% of those ages 80 and older are smartphone owners.

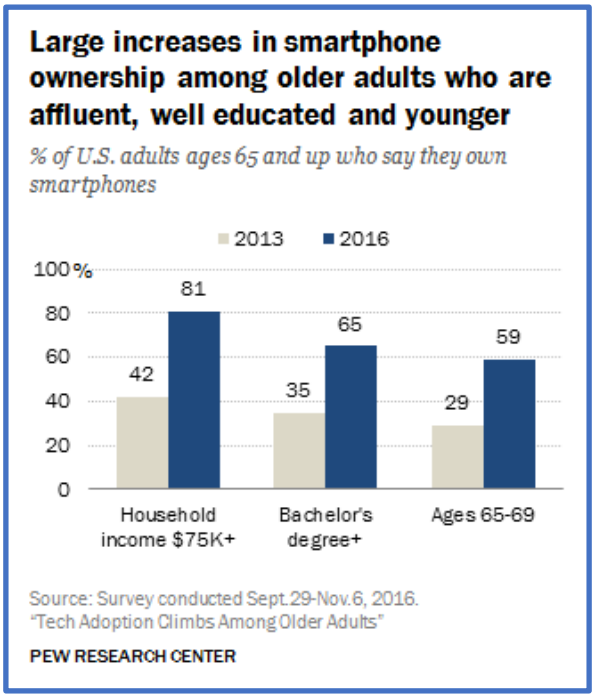
Smartphone ownership is also highly correlated with household income and educational attainment. Fully 81% of older Americans whose annual household income is $75,000 or more

say they own smartphones, compared with 27% of those living in households earning less than $30,000 a year. Additionally, around two-thirds of seniors with bachelor's or advanced degrees report owning smartphones (65%), compared with 45% of those who have some college experience and 27% of those who have high school diplomas or less.

Seniors in these high-adoption groups have seen the largest growth in smartphone ownership in recent years. Since 2013, smartphone adoption among older adults who live in households earning $75,000 or more a year has increased by 39 percentage points; those with at least bachelor's degrees, as well as those who are ages 65 to 69, have each seen a 30-point increase in smartphone adoption over that time.

When the Center began tracking internet adoption in early 2000, just 14% of seniors were internet users. But today, 67% of adults ages 65 and older say they go online.





The technologies in this report are grouped according to the intended user. However, some of the products, especially ones that facilitate communication, have multiple users, such as medical alert pendants that electronically signal emergency responders. In these cases, the products are grouped according to end user who receives, analyzes and/or responds to the information. Additionally, some of the technology products were originally designed for a general, non-age-specific audience, which have been repurposed for seniors; while other products are age-specific or intended for use in an SH, SL and/or nursing care facility. Pricing information is provided where available. This report concludes with an SL facility management directory, with 17 product categories listed, including Technology/Software.

Technologies for Medical Personnel

Remote patient monitoring

Health Harmony. This new product of Intel-GE Care Innovations, a joint venture between Intel Corporation and GE Healthcare, simplifies remote patient monitoring (RPM) by providing intuitive technology that enables individuals, clinicians, care providers and family caregivers to collaborate on patient care. Residents also have access to a video chat platform that enables a caregiver and the resident to virtually connect with one another to discuss conditions and assess a resident's environment. Initially, Health Harmony is available to a group of residents at Front Porch, a Glendale, California based nonprofit SH and SL organization that serves more than 5,000 residents. Front Porch, in partnership with Intel-GE Care Innovations, is measuring the benefits of leveraging RPM.

Additionally, Front Porch is undertaking four different telemedicine and telehealth initiatives, including:

- Videoconference health education, allowing a single health care provider to speak simultaneously with many seniors.
- Remote patient monitoring, giving seniors greater access to data about their vitals, with information on weight, blood pressure and blood sugar.
- Computer and health literacy, enabling seniors to more immediately educate themselves about their own health by becoming more comfortable with web research.
- Teleconsultations, limiting the number of physical trips seniors must make for their health care.

(Sources: CDW Report, PhysicianNewsNetwork.com)

TeleHealth Solution. Indicated for use by clinicians in clinical settings and for home use by patients, the IDM100 is an integrated medical tablet revolutionizing how patients and health care providers connect for clinical care anytime, anywhere. Patients and clinicians use the IDM100 to interact in person, or remotely, with Virtual Exam Room, a HIPAA-compliant, secure video conferencing feature. In addition, the IDM100 also stores and seamlessly synchronizes patient data to Electronic Medical Records. When a Virtual Exam is conducted with the IDM100, the clinician can remotely view the patient's diagnostic data in real time with the clinical accuracy of an in office exam.

(Source: http://www.telehealthsolution.com/rural-healthcare-telemedicine-technology/)

Emergency medical alerts

Connect America pendent or bracelet. Activated with the press of a button, an alert can be sent from almost anywhere in the home. Communication through the two-way speakerphone base unit enables Connect America's emergency operators to send emergency help. EMTs are informed of the individual's existing medical conditions. The product also works via a cellular

based phone. Another product, MobileElite, provides GPS location services and has fall detection available. Pricing from $19.95 per month.

The healthcare division of Connect America is the largest independent provider of personal emergency response systems in the U.S. The company partners with home healthcare agencies, Medicaid agencies, hospitals, drugstore chains and other healthcare organizations nationwide to provide emergency monitoring services for individuals. Connect America also provides telehealth services and medication management tools.

(Sources: AARP.org, https://connectamerica.com)

Life Alert®. This product is offered by Life Alert Emergency Response, Inc., the "Help, I've fallen and I can't get up!" company. The senior wears a pendant or wristband that has a help button which, when pressed, connects with a dispatcher, who initiates an emergency response. The product can be used for medical emergencies, shower mishaps, home intrusion, and on the road via Life Alert Mobile. Features include a special app for smartphones, and the company will program the user's cellphone so that it speed dials the monitoring center. Cost of pendant is $49.95 per month, plus set up fee of $95 to $198.

Other emergency medical alert products include Medical Guardian, MobileHelp, LifeStation, Help Button, MedicalAlert, LifeFone, and GreatCall.

(Sources: www.aarp.org, https://www.inhomesafetyguide.org)

HomeSafe AutoAlert. Worn around the wrist or neck, an emergency pendant can be pressed in case of an emergency, such as after a fall, and a call is immediately made to 911 and/or pre-programmed numbers of family members. The product uses "highly tested fall detection technology" that is designed to sense a wearer's fall and contact Lifeline immediately, even if the button is not pushed. Sold by Phillips Lifeline, HomeSafe AutoAlert costs $44.95/month for a landline phone and $56.95/month for a wireless phone. The mobile GoSafe option costs $54.95/month for the landline version or $64.95/month for the wireless option, along with a one-time $149 device fee.

(Source: https://www.lifeline.philips.com/medical-alert-systems/homesafe-autoalert.html)

Technologies for Senior Living Residents, Family Members and Important Others

Video chatting

These telecommunications applications work via a camera on a smartphone, tablet, laptop, or desktop computer's webcam. Also, they do not cost anything when used with others having the same application and having wi-fi connectivity.

Skype and *FaceTime*. This Microsoft product, is a telecommunications application that specializes in providing video chat and voice calls. First issued in August 2003, Skype

revolutionized video chats for personal use in ways that videophones, dating back to the 1950s, did not. Skype can be deployed on computers, tablets, mobile devices, the Xbox One console, and smartwatches via the Internet and to regular telephones. Users purchase a Skype number, available in 23 countries, for unlimited incoming calls.

FaceTime is also a telecommunications application, but is limited to Apple users. Introduced in 2010, it can be used on supported mobile devices that run on iOS and Macintosh computers that run Mac OS X 10.6.6 onwards. FaceTime also has an audio only version.

(Sources: https://www.skype.com/en;
https://itunes.apple.com/us/app/facetime/id414307850?mt=12;
https://www.usatoday.com/story/tech/columnist/saltzman/2017/06/24/aging-place-tech-helps-seniors-live-their-home-longer/103113570)

Resident room automation

Fibaro home automation system. This product controls smart home devices including Phillips Hue (personal wireless lighting system), iRobot (vacuum cleaner), Sonos (wireless speakers and home sound system), D-Link (home computer networking), and NetAtmo (thermostat, security camera, face recognition). Fibaro devices include: (a) Wall Plug, providing power metering for electrical devices; (b) The Button, which manually activates or deactivates any device and actions within the Fibaro system; and, (c) Swipe, in which specific hand gestures are detected by Fibaro. Additionally, systems that are supported by Fibaro are Apple HomeKit (including Flood Sensor, Motion Sensor, and Door/Window Sensor) and ZWave (including smart thermostats, lighting sensors, locks and hubs). Finally, access to home and personal data are protected through the WAF and Anti-DDoS systems, encrypted communication using the TLS protocol, and passwords using bcrypt.

While Fibaro is designed for the home, it seems likely that it could be set up in individual Senior Living units by an IT person working for the facility.

(Sources: https://ageinplace.com/technology; https://www.fibaro.com/us/why-fibaro;
https://www.apple.com/ios/home; www.z-wave.com)

Programmable lighting systems: Research estimates that as much as 40 percent of senior living falls occur in the evening or at night. But even during the day, the glare of too-bright lighting can be a hazard for sensitive senior eyes. Several companies are introducing programmable lighting systems that can react to resident movements, adjust themselves to the level of light needed and even mimic different times of the day. Additional data analytics features give providers a much better view of resident activities that could indicate clinical complications or falls risks. The newest advancements are in the combination of adaptive lighting systems and data analytics to study night-time behaviors that may be a clue to clinical problems.

Luna Lights, a Chicago-based startup, uses a series of battery-operated lights connected wirelessly to a thin bed sensor to provide gentle illumination whenever a resident gets out of bed. Photo sensors register the current light level in the room and adjust themselves automatically,

staying on until the resident returns to bed. The system can be programmed to alert caregivers if the resident doesn't return in the expected amount of time, and its data analytics features can track patterns in night-time exits from bed.

Stack Labs is redesigning the potential of light bulbs themselves. The Cupertino, California, startup is developing self-adjusting "intelligent" light bulbs that learn the lighting needs and preferences of individual residents. Motion sensors turn lights on and off automatically and adjust brightness based on the natural light in the room. Circadian lighting programming can automatically change the hue and intensity of lighting based on the time of day, mimicking the entire cycle of natural light—from the pale yellows of dawn to the warmth of noon and the cool blues of dusk.

(Source: https://www.iadvanceseniorcare.com/article/bright-ideas-smart-lighting)

Daily activity and personal health monitoring

GrandCare Systems. A multipurpose system that tracks daily activity, has medical monitoring (glucose, oxygen, blood pressure, weight) and can display information on diets, discharge plans, exercises. Wireless activity sensors monitor daily resident activities. GrandCare has a large touchscreen that provides activity and health monitoring, medication prompts, as well as easy communication. The resident can use GrandCare to watch videos, view family or Facebook photos, listen to music, play games, read the news and video chat with family. West Bend, Wisconsin based GrandCare Systems seeks to reduce the cost of chronic conditions, and long term, post-acute, and hospice care, by providing a fully-featured, residential home system to support aging and healing in place.

(Sources: https://www.grandcare.com, https://www.aarp.org/home-family/personal-technology/info-2014/is-this-the-end-of-the-nursing-home.html)

Telehealth

Carie by EpicMD. Mobile technology telehealth platform allows patients to see their physician or choose from the network of physicians, including specialists, that also offer in-office visits local to the patient. This offers patients a full-fledged healthcare solution that goes well beyond a 5-to-10-minute primary care consultation with an unknown doctor. At the patient election, this is their own doctor or specialist, at the right time.

(Source: http://www.carie.com/)

Medication managers

A handful of products are designed to remind, dispense, and/or manage medication. Two such products follow.

MedTime Station. This product, which vaguely has the appearance of a drip coffee maker, is supplied by Wellesley, Massachusetts based e-pill. At medication time, the device will alarm,

prompting the resident to pull the blue handle on a tipping device. The pill dispenser will rotate and the pills will fall out into a stainless steel cup. The complete system comes with the pill dispenser, a tipper, a cup, batteries, dosage rings, two keys, and a manual. Available for $289.95.

(Sources: https://www.epill.com;
https://www.usatoday.com/story/tech/columnist/saltzman/2017/06/24/aging-place-tech-helps-seniors-live-their-home-longer/103113570)

MedMinder Pill Dispensers. This digital pill dispenser, a product of Needham, Massachusetts based MedMinder, looks like a regular monthly dispenser. However, the MedMinder pill dispenser is equipped with wireless technology (internal cellular modem) that updates MedMinder's central computer about the patient's dosage activity. The information is available online for caregivers who can also receive immediate email or text messages notifications and weekly reports. Caregivers can program the pill dispenser and customize preferences remotely via the Internet. Additionally, the pill dispenser uses a built-in micro cellphone to connect with MedMinder's monitoring station. Four different models range in price from $39.99 to $64.99 per month.

(Sources: https://www.medminder.com;
https://www.aarp.org/home-family/personal-technology/info-2014/is-this-the-end-of-the-nursing-home.html)

Smart beds

360 Smart Bed. Sleep Number Corporation unveiled its revamped smart bed line in January 2017, starting with its new 360 bed, which has a number of patented bed features that are well suited to seniors. According to an online product review on Circuit Breaker, the bed does a lot: it automatically adjusts to one's sleep position for comfort, detects snoring and elevates one's head accordingly, figures out how well one has slept based on heart rate, breathing, and your tossing and turning; and, provides foot warmers, the bed's true star. The 360 Smart Bed also syncs with other health and fitness apps, including Fitbit® and the Nest Learning Thermostat™, which allows the sleeper to identify the optimal bedroom temperature for sleep.

(Sources: https://www.sleepnumber.com/360;
https://www.theverge.com/circuitbreaker/2017/1/8/14195396/sleep-number-360-smart-bed-ces)

Stove sensors

Inirv React. According to a CNN.com health report, Georgia Tech researchers are testing and developing cutting-edge devices to determine which can make the home safer for older adults. In a living lab, called the Aware Home, research conducted there has revealed some of the top home-related concerns among older adults, said Brian Jones, director of the Aware Home and a senior research scientist at Georgia Tech. "Some of the concerns they had were around unattended cooking," he said, adding that the No. 1 cause of fires in older adults' homes is cooking equipment. "Some of the concerns they had were around unattended cooking," he said,

adding that the No. 1 cause of fires in older adults' homes is cooking equipment. One new device called Inirv React and initially shown on the television show “Shark Tank,” connects one’s stove to a sensor in the home and to a smartphone app. Inirv React is the first device that lets a person control their stove from a smartphone and helps to prevent house fires. Its combination of sensors and electronics enable it to not only detect high levels of smoke, natural gas, and lack of motion, it also reacts and turns the stove off to keep you safe. The sensor will automatically turn the stove off if it no longer detects motion around the appliance after a long period of time. Inirv React, consisting of a sensor hub, smart knobs that are retrofitted to the stove, and app, is available for $299.

(Sources: https://inirv.com; Verge.com; https://www.cnn.com/2017/09/25/health/older-adults-home-safety-technology/index.html)

Personal robots

Buddy. Blue Frog Robotics, a Paris-based company with offices in Boston and San Francisco, has created Buddy, a companion robot that serves its owner as a personal assistant. Buddy, who has the appearance and shape as somewhat of an androgynous “Casper the Friendly Ghost,” can act as a calendar reminder and alarm clock, and connect with home security systems. The robot offers assistance in the kitchen, entertains the family with music and videos, acts as a calendar and alarm clock and interfaces with popular smart home solutions. In an SH or SL setting, Buddy provides fall detection, enables its user to communicate with loved ones via teleconferencing, provides medication reminders, and provides numerous other benefits. Finally, Buddy, who stands about two feet tall, is built on an open-source technology platform making it easy for global developers to build applications. It won the CES 2018 Best of Innovation Award.

(Sources: www.bluefrogrobotics.com/en/buddy; Verge.com)

Hector (in development). This personal robot was designed by Smart Homes, a company based in Netherlands, for CompanionAble, a program that uses technology to help senior citizens live independently. Hector is designed to be an in-home caregiver for elderly people who have mild cognitive impairment. It provides reminders for everyday tasks, like taking medications, calling people back, and storing grocery lists. For individuals experiencing occasional memory loss, Hector will collect wallet and keys, detect falls, and respond to verbal commands. He has been described as a walking, talking smartphone, with a much larger touch screen and smarter "brain."

A series of live-in tests were conducted to see how Hector would interact with the people for whom he cares. Although, there's still more work to be done on Hector before he's released to the public, Robots.net reports that all test subjects thought Hector was helpful, and those that were frightened of the bot at first eventually came around.

(Source: https://mashable.com/2012/09/15/robot-senior-care/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed:+Mashable+(Mashable)#Fy2kK3YFJgqD)

Computer designed for seniors

Wow! Computer. This high def 1920x1080 touchscreen computer has numerous features designed specifically for seniors. Besides a 22" monitor that delivers a clear image, it has oversized keyboard buttons, a mouse, stereo speakers built into the monitor, a customized Linux operating system that prevents downloads of executable files, built in security system, automatic updates, and U.S. customer service. According to one blog, the Wow! Computer's lack of productivity software means that this is not the machine for everyone, but is ideal for newbies who just want a computer to keep in touch with the modern world. Units start at $1,099.

Resident entertainment, recreation, and contact with loved ones

iN2L. This Centennial, Colorado based company offers a complete hardware and software package containing hundreds of applications for recreation, social connection, memory care engagement and billable therapy. It has been installed at more than 2,000 SL communities in the U.S. and four other countries. Hardware includes touchscreen computers, built in webcam, and other features. Software includes picture based interface, continually updated content, video chat, and other communication features. Features and programs for seniors include:

– Engagement activities
– Speech, physical and occupational therapy
– Games and puzzles
– Spirituality content
– Family connection via Skype and other tools
– Lifelong learning programs
– Exercise videos
– Exploration of the world
– Individualized user experience
– Cognitive stimulation (including for MC residents)

Business partners of iN2L include Eden Alternative, The Pioneer Network, The Greenhouse Project, ICAA, Leading Age, CAST, the Dementia Action Alliance, and Wish of a Lifetime—all dedicated to advancing the quality of life of seniors.

In a recent demonstration project of one iN2L product, the FOCUS tablet computer platform, senior residents of Michigan-based EHM Senior Solutions and area high school students in Denver, Colorado explored the emotional and intellectual dimensions of memory loss. Using the iN2L, students conducted interviews with MC reisdents at EHM to create visual and audio stories based on the seniors' personal recollections. "This project was designed to bridge a gap between fast-paced, tech savvy high school students and older adults with memory impairment," said Denise B. Rabidoux, President and CEO of Ann Arbor-based EHM Senior Solutions. "Our goal was that these sensitive encounters would prepare students for experiences they may have in the future with loved ones, neighbors and friends." (See https://www.evangelicalhomes.org/AboutUs/News/TabId/352/PostId/304/creating-a-real-life-video-experience-for-individuals-facing-memory-loss.aspx.)

Technologies for Facility Management and Staff

Some of the most important technology innovations in SH and SL facilities enable management and staff to monitor residents. These innovations have obvious benefits for resident health, and

also help to reduce potential liabilities for facility operators. Resident monitoring systems use bracelets (or other so-called "wearables") with radio frequency identification (RFID) chips and exercise equipment to give staff insights into resident health and even sleep patterns. Research shows that for a senior predisposed to falling, a night of bad sleep can increase falls by 40%, says Charles Turner, president of LifeWell, a Houston-based operator. ("The Top 2018 Technology Trends that Will Transform Senior Living," published by CDW Healthcare and *Senior Housing News*.)

One SL chain operated uses a variety of technologies for purposes of business and resident security, according to a report published by CDW Healthcare. Sunrise Senior Living, with 325 facilities across the U.S., Canada and U.K. and a total of about 30,000 residents, uses a mix of email spam filters, sophisticated firewalls, endpoint solution systems and mobile device management systems. For physical security, Sunrise uses solutions such as automated and pass-key-activated locking exterior doors, while also evaluating the use of RFID-embedded chips in wearables to ensure resident safety. ("The Top 2018 Technology Trends that Will Transform Senior Living," published by CDW Healthcare and *Senior Housing News*.)

Activity based sensors

Wellness. This safety product integrates a suite of sensors and devices, then applies machine learning algorithms to the data they generate, to proactively detect changes that may suggest resident risks. Family members and caregivers can monitor their loved one's activity, such as how much time is spent in bed, in a favorite chair or out of the house. And, with sensors to track and learn one's activities of daily living, Wellness can identify anomalies that may signify a problem. Coupled with Alarm.com's home security solution, Wellness is about $50/month, after installation costs, but pricing depends on the service provider and the exact mix of devices and sensors. Wellness can be paired with emergency response pendants.

(Source: www.alarm.com/productservices/wellness.aspx)

Sprout. Tapei City, Taiwan-based Smart X Lab has developed a smart bed sensor that is capable of detecting pulse and respiration rate. It comes in the form of a thin tape that one slides under the bed sheet, which detects movements in bed. It can sense, for example, whether the person has gotten out of bed or has changed positions in bed.

The smart bed sensor is coupled with another Smart X Lab product, the X-Mesh™ network system, enabling facility management and staff to monitor hundreds of resident beds simultaneously. The information is displayed on a dashboard on one's computer, which also enables staff to organize a daily log for seniors. Sprout collects senior health and activity data from automatic IoT devices or manual entry, and analyzes the data with advanced artificial intelligence to provide warnings when it spots alarming trends or abnormalities.

(Source: http://smartxlab.com/solution/senior)

Technologies for Facility Marketing and Promotion

According to SeniorHousingBusiness.com, “Seniors aren’t the only people who expect communities to harness the power of intuitive, informative technology. Their adult children have high standards as well. SL operators that recognize and respect that preference can create a positive first impression with prospective residents and their families by having more than just a simple website describing their offering.

“One addition to a website that can have a powerful impact is real-time unit availability shown on a community map…Add other persuasive content like 2D and 3D floor plans, virtual tours, and details on finish options…Large, high-resolution, touch-sensitive panels can entice prospects into participating in an immersive, interactive community tour. Whether guided by a sales counselor or self-directed, these explorations create memorable experiences and also a sense that a community is investing in resident satisfaction…The touch screens can display a wide range of content. Frequently a unit will have a marketing video or slideshow looping when it is not in use, with an eye-catching message encouraging visitors to engage. Once activated, the panel’s intuitive navigation allows prospects to access virtual tours, photo galleries, interactive site maps with availability information and much more. (http://www.seniorshousingbusiness.com/industry-voices/why-senior-living-communities-are-adopting-interactive-technology)

Digital signage and video messaging

Aavelin. This turnkey digital signage and video messaging system is offered by ClearOne, a global company that designs, develops and sells conferencing, collaboration, and network streaming & signage solutions for voice and visual communications. Digital signage delivers high visibility information to public areas such as a lobby, hallway, or elevator, on any LCD or plasma display. Other product features include a broadcast channel, for creating and distributing content over an existing cable infrastructure; room information, used to display room schedules and other information; and, web suite, a cloud based digital signage platform.

In the SL industry, Aavelin owners include Leisure Care Village, Mennonite Home, and Presbyterian Home.

(Sources: www.clearone.com; http://www.seniorshousingbusiness.com/industry-voices/why-senior-living-communities-are-adopting-interactive-technology)

Technology Integration

The biggest technology trend in senior living for 2018, though, is not any particular item. It’s how they work together – a concept known as “interoperability.” “From a clinical standpoint, this is where the data goes from interesting to exciting and interesting to useful,” says Michael Skaff, Chief Information Officer of San Francisco-based Jewish Senior Living Group. The new challenges in integration, then, will be creating a system that is simple on the front end but sufficiently complex on the back end to both process and create actionable insight from the myriad data sources. That means technology companies building a system designed specifically for SL, and SL providers training staff to understand and use these systems. (“The Top 2018 Technology Trends that Will Transform Senior Living,” published by CDW Healthcare and *Senior Housing News*.)

Devices of the future are expected to collect and use data to become much more personalized, says Elizabeth Mynatt, a professor and executive director of the Institute for People and Technology at Georgia Tech…For instance, a long hallway in the Aware Home is equipped with gait-sensing technology through which the walking patterns of someone strutting by are screened, collected and analyzed. Those personalized data could be used to track that individual's health. The data even could be programmed with an algorithm to alert a caregiver if any potentially harmful changes emerge in the gait pattern. (Verge.com)

Integrated products

SilverSphere (including Atmos Emergency Call Systems, Stratos (data management and reporting), and Markentum (marketing management). SilverSphere is a technology company that creates emergency call systems for SL facilities. Its software platform features a sensor network and predictive health technology to ensure senior safety and security and provide for care accountability. It includes desktop software and a mobile app for use by staff. Atmos products and services include wireless pendants, smoke detection, staffing rounds checks and reminders, maintenance detection, wandering/movement monitoring, and access control. Its second product, Stratos, provides detailed data management and report, and uses a digital dashboard to present data. It includes US-based technical support. Markentum is a program to aid facility marketing.

(Source: www.silversphere.com)

NucleusCare. The NucleusCare device is a communication device that allows individuals to video chat with their home care provider and their loved ones. Care providers can augment their service offering by providing remote care and collecting biometric data, while family members can gain the peace of mind of knowing their loved one is well.

The NucleusCare Suite includes a video chat device for the client’s residence, a web application for care coordinators (i.e. facility staff), mobile apps for care coordinators and family members, and wireless sensors to collect biometric data. The device enables video and audio calls that allow coordinators to check in on clients, and caregivers can use the device to check in and out of patient visits, helping coordinators to keep track of time sheets and allowing family members to know when care has arrived. The web portal enables checking in on clients via web browser through video and audio calls, reviewing client profiles, checking on their device status and access their call and visit logs, assigning caregivers to specific visits, and mass messaging caregivers with important notifications. Wireless biometric devices measure blood pressure, temperature, weight, and heart rate.

(Source: www.nucleuscare.com)

STANLEY Healthcare's Arial Events Management, Notification and Reporting Platform. Serves a wide range of organizations—from small, one-location communities to national networks with many facilities and diverse requirements spanning skilled nursing, assisted living and independent living. Services include:

- Centralizing event management, notification and reporting within and across communities.
- Meeting diverse resident and regulatory needs, including providing a UL listed nurse call system in skilled nursing facilities where required.
- Integrating wander management with emergency call functionality.
- Capturing and analyzing robust data to support high quality care and efficiency.
- Putting notifications in staff members' pockets with the Arial Mobile App for Android and iOS devices.
- Accelerating installation and reducing costs of ownership by leveraging existing Wi-Fi investments.
- Extending functionality to manage multiple systems, including fire panel, access control, wired nurse call equipment and fall management.

(Source: https://www.stanleyhealthcare.com/solutions/senior-living/resident-safety)

Reference Papers

"The Top 2018 Technology Trends that Will Transform Senior Living"
Published by CDW Healthcare and *Senior Housing News*
MKT23967 ©2018 CDW LLC
http: https://g5-assets-cld-res.cloudinary.com/image/upload/v1515431742/g5/g5-c-icnj24wl-benchmark-senior-living-client/g5-cl-53ijb17qb-benchmark-senior-living/uploads/Senior_Living_News_Top-Tech-Trends-WP-r7_-_Quotes_Moulay_dyifdc.pdf

This white paper examines five key areas where technology is changing the SL landscape in 2018: wearables, the Internet of Things, telemedicine, voice activation and security.

"Tech Adoption Trends Among Older Adults"
Published by Pew Research Center/Internet & Technology
May 17, 2017
http://www.pewinternet.org/2017/05/17/technology-use-among-seniors/

See excerpt on pages 1-2.

Product Directory

Senior Living Facility Management Directory
http://www.seniorlivingfacilitymanagement.com

Product and service categories, with the number of suppliers listed in parentheses, include:

Business Management
- Administration (43)
- Consultants (96)
- Education and Training (60)
- Finance / Accounting (30)
- Human Resources / Staffing (71)
- Legal Services (32)
- Marketing (83)
- Materials Management (3)
- Regulatory Compliance (21)
- Telephone Systems (5)

Design / Build
- Architectural/Engineering Design (160)
- Construction (69)
- Emergency Restoration and Repair (9)
- Facility Development (64)
- Interior Design (67)
- Project Management (30)

Environmental Services
- Air Purification Systems (4)
- Cleaning Services and Supplies (11)
- Infection Control (31)
- Medical Waste Management (3)
- Odor Control (11)
- Waste Management (3)

Exercise, Fitness and Wellness
- Activity / Therapy Services (34)
- Brain Fitness (19)
- Cable Television / Internet (10)
- Exercise / Recreation Equipment (23)
- Mobility Aids (4)
- Wellness Programs (31)

Facility Maintenance and Repair
- Elevators (5)
- Energy / Conservation (7)
- Equipment Repair (5)
- Floor and Carpet Care (7)
- Grounds Care (5)
- HVAC (10)
- Pest Control (6)
- Plumbing Systems and Equipment (11)
- Wall / Corner Protection (9)
- Wall Coverings / Clocks / Artwork (22)
- Window Treatments (16)

Housekeeping/Laundry/Linen Services
- Cleaning and Maintenance (5)
- Housekeeping Services and Supplies (11)
- Laundry Equipment and Supplies (21)
- Laundry Services (9)

Mobility Equipment
- Bathing Equipment (38)
- Door Openers (8)
- Elevator (5)
- Lift and Transfer Devices (28)
- Mobility Aids (38)
- Positioning Devices (5)
- Ramps (20)
- Scooters (16)
- Walkers / Canes (21)
- Wheelchair Washers (3)
- Wheelchairs / Accessories (32)

Personal Products and Services
- Clothing (9)
- Commodes (23)
- Dental Care (1)
- Diabetes Care (7)
- Incontinence (28)
- Medication Management (36)
- Non-Medical Equipment and Supplies (25)
- Oxygen Products (5)
- Personal Products and Services (54)
- Wound / Skin Care (17)

Pharmacy Services and Supplies

Rehabilitation Services
- Occupational Therapy Services (17)
- Physical Therapy Services (50)
- Rehabilitation Equipment / Supplies (36)
- Speech and Language Therapy Services (12)

Resident Care

Windows and Window Equipment (8)

Financial Services
Banking / Investments (38)
Group Purchasing Organizations (GPO) (5)
Insurance / Risk Management (65)
Loans (46)
Valuation Consultants (10)

Foodservice
Equipment and Supplies (32)
Food and Beverage Service (12)
Foodservice Management (17)
Menu Management / Nutrition Consulting (26)

Furniture / Furnishings
Appliances (15)
Bariatric Furniture (14)
Bathroom Furniture (11)
Bedding / Linens (20)
Beds (21)
Cabinets (15)
Dining Room (17)
Equipment (20)
Flooring (25)
Furnishings (34)
Lighting (19)
Outdoor Furniture (20)
Seating / Tables / Casegoods (46)
Signage (16)

Adult Day Programs (6)
Alzheimer's / Dementia Care (23)
Assisted Living Services (16)
Home Health Care (23)
Hospice Care (15)
Independent Living (24)
Skilled Nursing (13)

Safety / Security
Access Control (29)
Accessibility Products (25)
Disaster Preparedness (17)
Emergency Response Systems (39)
Fire and Life Safety Systems (6)
Nurse Call / Communication Systems (14)
Resident Monitoring (34)
Surveillance (14)
Wall / Corner Protection (2)

Technology / Software
Audio / Visual Products (13)
Cable Television / Internet Services (7)
IT Consulting Services (19)
Mobile Technology (4)
Monitoring Equipment (12)
Software (113)
Wireless Point of Care Systems (18)

Transportation
Transportation Equipment (25)
Transportation Services (17)
Vehicles (38)