



AGING IN PLACE

AND THE ROLE OF BROADBAND

Rural Telecom Educational Series



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“Modern death is a matter of bright rooms and hard machines. Live long enough and you might be filed away in a nursing home, your history scoured away, your life winnowed down to a few items on the table and some pictures of people who don’t come around enough.”

—James Lileks

THIS PORTRAIT OF MODERN MEDICINE reflects a grim fear that many older people harbor about their final days. Many hope to escape that fate by being able to “age in place” or stay in their homes. Telemedicine may be one of the key factors in allowing more seniors to comfortably and safely live in their own homes.

FOR SENIORS LIVING IN RURAL AMERICA, aging in place can be especially challenging because of the lack of transportation, the scarcity of doctors and hospitals, and fewer at-home services. In addition, the elderly in rural areas are more likely to suffer chronic conditions, such as arthritis, hypertension, diabetes, and heart disease.¹ All of these reasons contribute to the fact that nearly 4 percent more rural seniors are in nursing homes than their urban counterparts.²

As the country's population—particularly the Baby Boom generation—continues to age, the need to better care for and serve the elderly will only increase. According to the Administration on Aging, there are currently 39.6 million Americans who are 65 years or older, which represents 12.9 percent of the entire population and about one in every eight Americans. By 2030, this number is projected to jump to 72.1 million (19 percent of the population), representing nearly one in every five Americans. The increase among those 85 years and older is expected to increase fivefold between 2000 and 2050.

The United States Department of Agriculture reports that rural areas of the country have a slightly higher percentage of those 65 or older, at 15 percent of the total population, versus 12 percent of seniors living in metropolitan areas. Regardless of locale—city or country—a nationwide survey by the AARP found that nearly 90 percent of Americans 65 or older want to stay in their homes for as long as possible and that 80 percent believe their current residence is where they will always live.

Telemedicine—a word sometimes used interchangeably with “telehealth”—could serve as an important piece of the puzzle toward the goal of aging in place. Telemedicine is defined as a method that brings patients and health professionals together regardless of geographic location to provide consultations and ongoing care. Telehealth is a broader, more encompassing term and includes non-clinical services, such as health-related distance learning, research, and administration. In its genesis, telemedicine was first conducted via telephones and fax machines; newer telemedicine applications have evolved to use the Internet and satellites to transmit images and data. Telemedicine comprises a wide array of services and technologies, ranging from basic to advanced. These include:

- Email service to allow health care providers to communicate with patients and other medical personnel.
- Internet connectivity to provide access to general medical websites, as well as patient-specific information from remote locations.
- Personal health monitoring devices to check vital signs, such as blood pressure, heart rate, and glucose levels.
- Remote patient monitoring appliances for medication dispensing and home fall sensors.
- Video teleconferencing systems in local hospitals, doctors' offices, and patients' homes to consult with specialists or conduct mental health sessions with psychiatrists.

Telemedicine can be further classified into three main categories:

- 1. Store-and-forward.** Medical information—typically in the realm of dermatology, radiology, or pathology—is sent to a doctor or specialist for analysis; this does not require the simultaneous presence of physicians and patients.
- 2. Remote monitoring.** Doctors remotely check a patient's vital signs and caregivers are alerted to falls or wandering.
- 3. Interactive services.** These involve concurrent interactions between patient and doctor. Services could comprise telephone and email exchanges, as well as live video connections between the two parties.



THE TIMING IS RIGHT

Gary Capistrant, senior director of public policy for the American Telemedicine Association (ATA), said the two telemedicine applications that can most help older people are the videoconferences with specialists and remote health monitoring devices and services.

“Videoconferencing allows a video visit with the doctor instead of traveling hours for a relatively routine matter or a follow-up consultation,” he explained. “Remote health monitoring checks the vital signs of patients with chronic conditions—diabetes, COPD [chronic obstructive pulmonary disease], heart disease—and ensures that patients are getting the care they need.”

Long Drives Could be Hazardous to Your Health

Sitting still for long periods of time—typically for several hours—increases the risk of blood pooling in the legs, forming clots, and traveling to the lungs where a clot could block blood vessels. For older people, particularly those who are in poor health, the risks are even higher. According to the Mayo Clinic, one out of 1,000 people get fatal blood clots each year, making it the fourth leading cause of death.

These factors worsen the odds:

- Being 60 or older.
- Having a pacemaker or a catheter in a vein.
- Suffering from cancer or heart disease.
- Recovering from recent surgery.

While much of the technology to provide telemedicine has been in existence for years, its real promise and potential has been stymied by a host of issues ranging from Medicare and Medicaid reimbursement to medical licensing and provisioning over state lines. Recent health care reforms and mandates are shifting the landscape and may work to overcome many of the barriers. These initiatives include the emergence of Accountable Care Organizations that reimburse (and penalize) doctors and hospitals based on patient outcomes rather than services.

International Data Corp. (IDC), a research firm, recently reported that these trends will spur health care providers to “not only to recommend patients use personal health monitoring devices (e.g., glucometers, blood pressure monitors, body composition monitors), aging in place technologies (e.g., remote patient monitoring appliances,

Telemental Health

Gary Capistrant, senior director of public policy for the American Telemedicine Association, noted that “telemental health”—the psychiatric branch of telemedicine in which patients meet via live video with mental health professionals—is one of the fastest growing segments of telemedicine. “Psychiatry is well suited to this technology because it involves talking, not laying on of the hands,” he said.

Maggie Ellis, community development specialist for Nex-Tech, a subsidiary of Rural Telephone in Lenora, Kan., said that telemental health is the primary telemedicine application among the hospitals and clinics that the co-op serves in western Kansas. “Right now, we’re mainly seeing them use their broadband networks for consultations with mental health professionals,” she said. “We are two to three hours from the nearest psychiatrist or psychologist. If someone’s in a desperate state, they can’t wait that long. Instead, they can go to the local hospital and use the videoconferencing facilities to have a real time screen-to-screen session.”

Capistrant added that older people who suffer from depression greatly benefit from this service. “Depression is a prime symptom for the elderly,” he said. “Someone suffering from depression is not prone to leave the house and travel to a psychiatrist.”

home and fall sensors, medication dispensers), and mobile health applications to promote health and wellness, but to actually provide those devices along with services to help consumers use them more effectively.”

ATA’s Capistrant said it’s a positive move that health care reforms are focusing on paying for results but noted that implementing reforms will take time. “It’s still a matter of translating that fancy rhetoric into regulations and payment schedules,” he said. “Things will likely be very different in two to three years; but, right now, there’s a huge gap between the potential and the actual.”

Closer on the horizon is the Rural Health Care Program of the Federal Communications Commission (FCC), Capistrant said, adding that he’s hopeful that the program and its proposed reforms will soon be finalized. “That’s a potential game changer,” he said. “That would be a huge financial resource in terms of broadband deployment, especially when it comes to that final mile into the home.”

The FCC’s Rural Health Care Program

In 2006, the FCC established the Rural Health Care Pilot Program to encourage the development and use of broadband networking services by health care providers in rural communities. The following year, the commission selected 69 program participants covering 42 states and three U.S. territories and allocated \$417 million to be spent over three years (provided from the Universal Service Fund). The goal is to give eligible rural health care providers discounted rates for telecommunications services, making them commensurate with those paid in urban areas.

Strictly speaking, the FCC’s program does not offer funding for that final mile into the home, but Capistrant said that building out the broadband networks to the official endpoints, such as hospitals and clinics, is more than half the battle. “Once you get that pipe into the community, it’s so much easier to take it from there,” he said. “That’s an important opportunity.”

Using Patient Monitoring Systems for Falls

“Help me! I’ve fallen and I can’t get up!” That was a comedic tagline of the 80s, but falls are no laughing matter. They represent a serious epidemic among the elderly.

According to the Center for Technology and Aging, falls are the most common cause of nonfatal injuries and of hospital admissions for trauma among older adults. Hip fractures—a common result of falls—are a major contributor to death, disability, and diminished quality of life among seniors. The center also reported these findings³:

- Getting help quickly after a fall reduces the risk of hospitalization by 26 percent and the risk of death by more than 80 percent.
- More than 1.8 million older Americans were treated in emergency rooms for fall injuries; one out of four was subsequently hospitalized.
- In 2004, falls were the leading cause of injury deaths among older people and were responsible for roughly 14,900, or nearly 43 percent, of all unintentional injury deaths in this age group.
- Fall-related death rates rise sharply with increasing age, with the greatest occurrence after age 79.
- Those that fall are two to three times more likely to fall again.





CAPITALIZING ON THE OPPORTUNITY

There is no question that this opportunity is not lost on many small, rural telephone companies. Most have been serving their small towns and remote outposts for decades and have built their stalwart reputations on community betterment and involvement, as well as dedication to service and subscribers. Rural telcos have a long history of catering to the needs of their older customers and have demonstrated this through various means, such as offering large print telephone directories, stocking large button telephones with voice amplifiers, and sponsoring Internet classes at senior centers.

In recent years, many rural telcos have been hard at work building broadband networks for local hospitals, as well as extending broadband coverage to residential subscribers. The convergence of these two trends—dedication to their older customers and the spread of broadband to rural hospitals and residents—makes a perfect marriage for aging in place telemedicine applications and services.

Nex-Tech, a subsidiary of Rural Telephone (Lenora, Kan.), first started building broadband networks out to its local hospitals and clinics in 1998. Today, the telco serves 11 hospitals and 14 clinics, allowing these facilities to transmit radiology images for analysis; provide interactive educational sessions for staff; and conduct videoconferencing between different health care professionals, as well as between patients and specialists.

“One of the hospitals in our area is able to use its broadband networks for physician-to-physician consultations for things like pain management,” explained Maggie Ellis, community development specialist for Nex-Tech. “In some cases, the doctor will bring in the patient to join the consultation.”

Access to specialists is one of the biggest benefits of telemedicine, Ellis said. “Rural hospitals don’t have specialists,” she said. “We are 90 miles from Hays where the specialists are. That’s a one- to two-hour drive, and gas prices aren’t going lower—that’s a real hardship on an older person.”

Mike O’Dell, marketing director for Pinpoint Network Solutions, an incumbent local exchange carrier in

Cambridge, Neb., echoed that sentiment. “Out here in the rural Midwest, you’ve got a significant drive time to a major hospital or cardiac facility,” he said. “Those are at least two hours away.”

Doctors and Specialists in Short Supply in Rural America

According to the National Rural Health Association, only 10 percent of physicians practice in rural America despite the fact that nearly one-fourth of the population lives in these areas. In addition, urbanites have access to more than three times the number of specialists as rural Americans.

Pinpoint first installed a telemedicine videoconferencing system for a local hospital in 1994. A decade later, the telco was offering broadband service. One offshoot of this initiative was the Total Joint Replacement Program, a videoconferencing project of the Tri Valley Health System to help doctors follow up with patients after surgery. Specifically, the system allows a doctor to interact with a patient through a high definition screen, discuss the progress, view the incision, and relay information about the next steps of recovery. “Being able to continue daily rounding on my patients was critically important to me,” explained Dr. Chris Wilkinson, an orthopedic surgeon. “As a surgeon, I do not want to simply replace their joint and send them on their way. I want to be there to ensure their recovery process is going as expected. Tri Valley has made its high-definition telemedicine system portable with

Remote Health Monitoring Services Give the Real Vitals

*"Hi Mom, how are you doing today?"
"I'm fine, I'm fine."*

This is a typical exchange between an adult child calling on a regular landline to an elderly parent, explained Josh Peldo, technology solutions consultant for Dickey Rural Networks, a cooperative in Ellendale, N.D. "Older North Dakotans will not complain about their aches and pains," he said. "There's a lot of German heritage out here, and these are stubborn, independent folks who grew up in hard times, lived through the Depression, built their farms from scratch. It's common for them not to say there's a problem—you won't find out about it unless it puts them in the hospital."

But remote health monitor devices come complete with scales to measure weights, arm cuffs to take blood pressures, glucometers to measure sugar levels. "Adult children can log in and look at those readings and say: 'You are not fine—you need to go in and get that checked,'" Peldo said.



equipment that be moved into the patient's room. This makes it possible for me to do my outreach service."

O'Dell noted that many small telcos are involved in similar projects. "Any rural telco with a small hospital in its area is likely working with it to set up videoconferencing capabilities," he said.

For telcos just entering the arena of telemedicine, many are looking at home-based personal health monitoring and remote patient monitoring systems. This is the case for Dickey Rural Networks, a cooperative in Ellendale, N.D., which has been working on telemedicine products in recent months.

"The family of one of our elderly customers contacted us about setting up a webcam—essentially a video camera in the house," explained Josh Peldo, technology solutions consultant for the co-op. "A local nursing home caught wind of the project and asked us to develop a similar service."

Since then, Peldo has been working on a webcam on wheels, which functions as a small robot. "Nurses, doctors, and adult children can dial in and drive this around the home to check up on the older person," he said. "It works great as long as there are not stairs."

Peldo is also working on a virtual health manager product in the form of an iPad with videoconferencing capabilities to allow a health care manager to check in on a patient on a daily basis. "So someone can walk through the questions every morning—everything from, 'How are you feeling today?' to more specific questions," he said. "The health care person can customize those questions and use the Internet connection. This lets professionals do assessments without the patient having to drive into town."

The ability to video call is essential, Peldo said. "It's not high definition, but it's certainly sufficient for this purpose—you can see a bruise, see some swelling," he said, adding that there's no video without broadband service. "Without broadband, there's no chance this project will take off."

The expense and complication of trying to implement and integrate outdated dial-up connections over the telephone lines is shocking compared to the ease and simplicity of

broadband, Peldo said. “One hundred percent of our territory is in fiber optics, so the products and services that we can put on there is virtually unlimited,” he said.

Peldo explained that the nursing home is hoping to secure funding for these telemedicine projects; and, once that is in place, testing could begin soon.

Spring Grove Communications, a telephone cooperative in Spring Grove, Minn., is just starting to explore plans for telemedicine because it recently completed a two-year fiber-to-the-home project. “We’ve got fiber to the home to every house in our service area, and that covers 100 square miles,” explained Craig Otterness, general manager and chief executive officer, noting that telemedicine would be a good fit. “This is a town of 1,400 and most are elderly.”

The Mayo Clinic in Rochester, Minn., is 70 miles north of Spring Grove; the Gundersen Lutheran Hospital is 30 miles away. For older people who have surgery in either hospital, the downside is the recuperation that involves a lengthy hospital stay or rehabilitation at a nursing home, Otterness said. “Most people would rather be home recovering in their familiar surroundings and with their dogs,” he said.

Smart Homes of the Future

In the future, technologists are hopeful that the phrase “old person’s home” will not mean “nursing home” but rather a house outfitted with a whole host of sensors and network devices to intuitively react to the needs of its inhabitants. Dozens of sensors throughout a house—on appliances, computers, smartphones, thermostats, etc.—could collect information on the location and wellbeing of the homeowners. For example, if an older person started cooking something on the stove but then left the kitchen and forgot to return; the sensor on the stove, using artificial intelligence, would alert the network device and turn off the burner. This combination of computer software, artificial intelligence, and data-mining technology is called “ambient intelligence,” and its potential uses and applications extend far beyond the stove example. Geriatric specialists are optimistic that this Jetson-like home technology will be highly suitable for aging-in-place applications, allowing older people to live independently years longer than their predecessors.

Otterness said he’s impressed with the scope and capabilities of telemedicine applications. “There are cameras in the house so you can check in on your parents visually,” he said. “Motion detectors can pick up motion—or lack of motion—in the house.”

Like Peldo, Otterness said he wants to take advantage of the broadband infrastructure. “Capacity is not a problem, and we’ve got redundant circuits,” he said, pointing out that this is a more reliable system than wireless solutions. “A lot of the telemedicine device makers are doing everything wirelessly—we need to get in there now so the telemedicine solutions are wired.”

Otterness said his plan is to go to the hospitals in the area and say: Let our customers be your customers. “We’re always looking for new revenue streams,” he said, noting that telemedicine would help spread the uptick of high speed Internet subscribers. “This would be beneficial to us and to our customers.”

MAKING THE BUSINESS CASE

Research firm IDC agreed that telecom providers would be smart to capitalize on the telemedicine industry, particularly the residential-based side of the business. “The total addressable market in home telehealth in the United States will grow to 60.3 million households in 2015,” IDC stated. According to a recent report from Kalorama Information, a health care market research firm, the market for remote patient monitoring technologies will grow from \$6 billion in 2011 to more than \$18 billion by 2014.

Science fiction writer Isaac Asimov once said, “Life is pleasant. Death is peaceful. It’s the transition that’s troublesome.” In the end, science and technology may be the forces that ease that transition, and small telephone companies in rural America are positioned literally and figuratively in the best place to help.

¹United Health Center for Health Reform and Modernization, *Modernizing Health Care: Coverage, Quality and Innovation*, Working Paper 6 (July 2011).

²Phillips, C.D.; Hawes, C.; and Leyk Williams, M. *Nursing homes in rural and urban areas, 2000*. College Station, TX: The Texas A&M University Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center (2003).

³Center for Technology and Aging, *Technologies for Remote Patient Monitoring for Older Adults* (2010).





Foundation for Rural Service

The Foundation for Rural Service, in cooperation with the National Telecommunications Cooperative Association, seeks to sustain and enhance the quality of life throughout Rural America by advancing an understanding of rural telecommunications issues.

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