

# Social Technologies for Interdependent Care:

## Will You Still Need Me – When I’m Sixty-Four

74...84...94 – the “success catastrophe” of our longevity – I first heard this droll term back in August 2002, used to describe the disruptively unintended consequences of technology-driven progress at the Computing, Cognition, and Caring for Future Elders Conference hosted by Intel. As an aspiring Future Elder, I was exploring the intersection of our longevity with technology:

**How might computing and information technology help us tap the potential of our greatest growing natural resource – the accumulating wisdom engendered by our new longer lives?**

Visionary gerontologist Ken Dychtwald asks: *Do Boomers Have The Guts And Wisdom To Course Correct Our Aging Nation?*<sup>1</sup>

*[S]ince 2/3 of all the people who have ever lived past 65 in the entire history of the world are alive today, longevity is truly humanity's new frontier... Unless we unleash and harness the untapped potential of maturing men and women, we will be wasting our absolutely greatest growing natural resources: longevity and wisdom. With the emergence of "homo-longevus," gray could be the new green.*

This article focuses on Boomers at the crucial intersection of aging in place with Telecare as it impacts the Social Determinants of Health<sup>2</sup> (the social and economic conditions in which people live, work and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks). The social health perspective of Telecare is important because it de-emphasizes the over-medicalization of natural aging processes and focuses instead on the low-hanging fruit that are within our reach to collectively address the emergent Age Wave demographic megatrend.

Telecare concerns the provision of care services at a distance to support individuals and their care providers by connecting people to their in-home care services and supporting their needs while mitigating their risks of living at home. Telecare may extend the practice of evidence-based medicine beyond the hospital and clinic by filling in the gaps that develop once patients leave the facility. Evidence-based Telecare has the potential to improve the quality-of-life and reduce health care costs by reducing preventable emergency room visits and hospital admissions, using a variety of means including technology-empowered self-care, early disease detection and prevention, and improved chronic disease and medication management.

Considering this enormous potential to empower people to age in place at home in community, why have Telecare adoption rates been so slow? The answer may be found by exploring the intersection of the Age Wave with two other megatrends: the Information Revolution and Financial Instability, that are driving the structural shifts we observe today.<sup>3</sup>

- **Are these megatrends interrelated?**
- **Is it just a coincidence that they are all converging now?**

## **Resetting Expectations: consequences of the financial collapse of 2008**

Our fragile economy, underfunded pensions, moribund health care system and growing care gap leave many American Boomers wondering whether they will be able to afford their retirement.

*Differences in gender, age, race, occupation and region powerfully mediated the Depression's impact on particular individuals. ... Unemployment fell most heavily on the most predictably vulnerable: the very young, the elderly...driven by the specter of permanent, structural unemployment as a result of accelerating technological change.<sup>4</sup>*

Though these words were written about the Great Depression, they also describe circumstances following the 2008 global financial collapse. As part of the New Deal, President Roosevelt responded to the resulting hardship by signing the landmark Social Security Act of 1935, which provided contributory retirement and disability benefits. Participation was mandatory, with contributions taken from employees and employers through payroll taxes. Today, the ratio of the number of workers paying these taxes to the number of retired people receiving the benefits is shrinking, while prices are increasing (from the cost of living to the escalating costs of health care). Social Security provides a major source of retirement income for 86% of Americans according to the U.S. Department of Health and Human Services Administration on Aging.<sup>5</sup> These “entitlements” – the right to guaranteed benefits – have come under increasing scrutiny, criticism and attack since the financial collapse.

The Employee Benefits Research Institute reported in 2012 that Americans' confidence in their ability to retire comfortably is stagnant at historically low levels. Just 14% are very confident that they will have enough money to live comfortably in retirement. Many retirees are reliant on Social Security as a major source of their retirement income, because 64% of retirees have less than \$50,000 in savings and investments, and 60% of current workers report that the total value of their household savings and investments is less than \$25,000.<sup>6</sup> The majority of Americans cannot afford to retire.

### **Breaking Promises: underfunded pension plans and health insurance benefits**

Detroit does not have enough tax revenue to reliably cover pensions, retiree health insurance and all of the debt it has sold to keep its budget afloat. A federal judge has ruled that Detroit can use bankruptcy to cut employee pensions and relieve itself of other crushing debts, handing a defeat to the city's unions and retirees. This decision set the stage for officials to confront \$18 billion in debt with a plan that might pay creditors and retirees just pennies on the dollar.<sup>7</sup>

#### **➤ Where Detroit has gone, will other pension funds follow?**

Judge Steven Rhodes ruled that federal bankruptcy law treats pensions as contracts and allows those contracts to be broken. The judge's ruling will reverberate far beyond Detroit – through America's \$3.7 trillion municipal-bond market. Neither bondholders nor pension-holders can expect to escape pain-free.<sup>8</sup> Public and private pension benefits are at risk. None of the 50 States' pension plans are fully funded, over half of them are funded at less than 70%, and this trend is worsening.<sup>9</sup> There is no assurance that current retirees will continue to get their full pension distributions or that future retirees will receive the pension benefits they were promised.

## **U.S. Healthcare System: high cost, low quality outcomes, many citizens uninsured**

According to the World Health Organization, the United States spent more on health care per capita, and more on health care as percentage of its GDP, than any other nation in 2011. The Commonwealth Fund ranked the U.S. last in the quality of health care among similar countries, and noted that U.S. care costs the most.<sup>10</sup>

Much of this high cost is due to over-treatment at the end of life, driven by entrenched interests and reimbursement incentives: 29% of Medicare beneficiaries spend their last month of life in hospital intensive-care units, prolonging a miserable quality-of-life. On average, Medicare spends \$20,870 per beneficiary who dies while in the hospital. According to geriatric physician Brad Stuart, *We literally treat them to death.*<sup>11</sup>

For years, many health-care providers have understood that late-life care for the chronically ill is expensive, ineffective and often inhumane. The rules are changing now in large part due to the Affordable Care Act, which seeks to replace pay-for-service models with pay-for-performance, rewarding healthy outcomes and penalizing preventable hospital readmissions. The Centers for Medicare and Medicaid Services is phasing in national, standardized payment rates for home health care.<sup>12</sup> If we are to develop sustainable healthcare systems, we must build a workforce, a business model, and a technology infrastructure that focuses more on early disease detection and prevention, and shifts health care to the home to make it more accessible and affordable.<sup>13</sup>

### **Fixing to stay at home amid a growing care gap**

The national average yearly cost for a person receiving care in a nursing home was \$87,235 in 2011. Assisted living facilities averaged \$42,000/year, providing residents who do not require skilled nursing care with services that support some activities of daily living. By 2030, the national average long-term care costs are projected to reach \$300,000 annually per person and 70% of those turning age 65 now will need long-term care. Neither Medicare nor most health insurance plans will pay for most of these long-term care services and one must spend down income and assets toward poverty to become eligible for Medicaid long-term care services.<sup>14</sup>

As Americans grow older, 92% of those 65 and older surveyed by AARP said that they want to remain in their own homes for as long as possible; 82% would prefer not to move from their current homes, even if they need help caring for themselves.<sup>15</sup> Given current circumstances and projected trends, most people will be aging in their homes by choice and / or necessity. Elders, aging in place and living in isolation within our communities, are one of the largest and fastest-growing underserved populations.<sup>16</sup> Two thirds of today's elders are living alone and many have small, dispersed families with few children to provide informal caregiving resources. One third of Boomers are currently unmarried. Many live alone and will have no living children or siblings to rely on for informal caregiving. As the Boomers age into their 80s, the diminishing caregiver support ratio will shift from a slow decline to a free fall, from 7 potential caregivers per frail elder today to just 4 in 2030.<sup>17</sup>

In 2009 over 60 million family caregivers provided care to adults with limitations in their daily activities, providing unpaid care efforts valued at \$450 billion.<sup>18</sup> Beyond the benefits of this informal caregiving, there are stealth costs that undermine U.S. economic vitality, including the lost productivity of employees whose attention becomes divided between their work and family

caregiving responsibilities. Three trends are converging to widen the care gap: the supply of family caregivers is failing to keep pace with increasing demand, the ratio of workers paying Medicare taxes to retired people is shrinking and the price of health care services per person is rising. These demographic trends define the immense challenges we face and the magnitude of the solutions that will be required to meet our emergent care needs.

- **Where will we find the resources that can scale with the growing population of elders to meet the increasing burdens on caregivers and the spiraling costs of health care?**

Starting in the 1970's, with the introduction of the first do-it-yourself home pregnancy test kit, the idea that people could be more medically self-reliant and practice self-care has blossomed. Futurists Alvin and Heidi Toffler coined the term *prosumer* (*producer + consumer*) to describe the progressive blurring and merging of the line separating producers from consumers.<sup>19</sup> They predicted that new Information Age technologies would enable prosumer markets to grow with low-cost, person-to-person communication and data exchanges. Today's ubiquitous Internet offers capabilities far beyond what even the prescient Tofflers could envision back in 1980, providing the infrastructure to support a broad spectrum of innovative social technologies.

## **Social Technologies Empower People to Achieve Better Health Care**

### **Society's Operating System and Social Software are powered by Social Capital**

Social capital refers to features of social organization such as the networks, norms, and trust that facilitate coordination and cooperation for mutual benefit.<sup>20</sup> There are two types of social capital, bonding, between members of the same group that creates social solidarity, and bridging, a more inclusive type that connects diverse groups, for example, through intergenerational exchanges. By interacting outside of their age cohort, elders become better integrated into their community and are likely to have an increased sense of efficacy and well-being.

Professor Edgar Cahn, founder of the Antioch School of Law and TimeBanks USA explains:

*Social capital is the resource with which a culture equips its members to cope with the future. To create new social capital, one must believe that one's actions have consequences, that there is a future, and that one can affect the future. ...The core operating system of our society is the non-market economy: family, neighborhood and community...if it malfunctions...nothing works. The programs and the specialized institutions that we count on cease to function.*<sup>21</sup>

Toffler revealed the financial markets' dependence on this core non-market economy by asking a corporate CEO: ***How effective would your best employees be if they were not toilet-trained?***

We take for granted our core economy and its profound, though largely invisible, contribution to the GDP because of an obsessive focus on the financial market economy. When we rely on money exclusively, the medium of exchange that defines market values, then we must live with the values of competition and the profit motive that drive financial markets. When money drives exchanges, people tend to act selfishly and think: ***What's in it for me?*** If we want to engage the caring, compassionate and cooperative qualities of our human nature, then we need something more vital and resilient than what money alone can purchase.

Expanding on the Toffler's concept of prosumers, Cahn developed the concept of Co-Production and the social technology of Time Banking to harness our core operating system and support the social relationships that enhance our quality-of-life. Co-Production gives responsibility to people who have been regarded as "the problem" in social services by treating them as essential assets as well as beneficiaries in the Co-Production of desirable outcomes. Time Banking is a kind of social software that lets people exchange services based on hours instead of dollars, providing a community credit system for our core economy that is counter-cyclical to the financial economy.

Time Banking offers an efficient method for prosumers to co-produce mutual support services, build social capital and rebuild community. Participation in Time Banking has proven to be a very positive experience for elders.<sup>22</sup>

**Example:** The Visiting Nurse Service of New York hosts the Community Connections Time Bank and reports that 41% of their 2333 members are age 60 or older, 26% live alone and 19% report fair or poor health.<sup>23</sup> In response to a member survey, 72% of respondents reported improvements in mental health attributable to their TimeBank membership, while 48% reported improvements in self-rated physical health and 79% reported that the TimeBank had given them adequate support to live in their homes and stay in their communities as they get older.<sup>24</sup>

Social capital has been declining as our population ages. If we are going to age in place, and wish to do so with a decent quality-of-life, then investing in community is perhaps the best hedge against unreliable pensions and financial investments. Investing in social relationships protects us from financial hardships, improves the quality-of-life for all and contributes to elders' ability to live in their own homes and remain connected to their communities. Communities can expand their social capital by cultivating trust and interdependence, which will grow over time through positive interactions and collaboration on mutual goals like the desire to age in place.<sup>25</sup>

Throughout our lives, we are embedded in a variety of different interpersonal relationships that include family, friends and neighbors. The value of these social networks increases as we age. People who are integrated into social networks tend to experience less anxiety and loneliness. Anxiety in elders has been linked to suffering from illness, cognitive decline, sleep disturbances and hospitalization. Loneliness is a common source of anxiety, suffering and poor quality-of-life, a key predictor of cognitive decline, depression, self-harm, suicide and alcohol and drug abuse.<sup>26</sup> A recent study published in the Archives of Internal Medicine<sup>27</sup> reinforces the vital interplay of social, health and functional factors: 43% of elders say they are lonely, and those individuals are twice as likely to have functional limitations in their activities of daily living that could lead to nursing home placement and / or result in premature death. Reconnecting elders to overcome loneliness is a universal key to unlocking the social health benefits of aging in community.

**Example:** The Caring Collaborative Model<sup>28</sup> provides a framework for mobilizing and organizing the goodwill that resides within communities, such as bringing a home-cooked meal to a neighbor who is sick, or accompanying a friend to an outpatient procedure. It offers three health-oriented service programs: a Service Corps, a Member Information Exchange and a Health & Wellness Resource Directory. Members benefit from the healthcare experiences of others, for example, knowing what to expect during breast cancer

treatment or how to optimize recovery following knee replacement surgery. It helps members prepare for a crisis, for example, when an accidental fall or unexpected diagnosis compromises their independence, and provides tremendous comfort in knowing that a network is in place where friends stand ready to lend a helping hand. A Time Bank records reciprocal member exchanges of information and services, and documents the transactions. Volunteers receive credit that they can use when they need help. The Time bank is designed to overcome resistance to asking for help. In this way, Time Banking closes the circle of giving and receiving. Combined with other social technologies, it can widen the circles of care by empowering elders to age more securely and successfully together.

### **Telecare helps mitigate the risks of independent living at home**

People have developed many clever ways to cope with their concerns about aging alone at home.

**Example:** The porch light becomes a do-it-yourself call for help signal when neighbors agree to monitor each other's well-being by checking if their porch light is turned on in the evening and off in the morning. A similar idea led to the invention of Personal Emergency Response Systems (PERS). The familiar call-for-help button used by PERS is very helpful, but it is not foolproof.<sup>29</sup> There are several reasons why PERS may fail to protect, beyond the obvious one that occurs when a person becomes incapacitated and can't push the button. Two other common reasons are: choosing not to wear the PERS button because it feels like a stigma that implies ones' frailty, and falling – but not pushing the button – out of fear that actually calling for help will be seen as a tacit admission that one can no longer live safely at home, which may culminate in the loss of their independence.

A smart home monitoring system that uses motion sensors to measure activity may detect a fall or incapacitation and call for assistance automatically. More importantly, it can also provide a sense of connection and awareness that all is well.

**Example:** A common application of smart home technology is to control a lamp with a motion sensor, so that the lamp lights automatically when someone enters the room. We repurposed this technology to create the "Presence Lamp"<sup>30</sup> as a clever way for two people living in their separate homes to know when each other is present. Imagine an elder who is living alone and their adult child, each sitting in their own living room. Each living room is equipped with a motion sensor and a Presence Lamp. These devices are interconnected through the Internet so that the motion sensor in the elder's home lights the Presence Lamp in the child's home, and vice versa. This simple arrangement creates a shared awareness of presence. The glow of their respective Presence Lamps gives each person the feeling of being connected to the other in a way that is comforting to both without being intrusive to either person.

This method of providing remote awareness can connect people across town or across the world.

**Example:** In Japan one may purchase an i-Pot<sup>31</sup> electric kettle that boils water for the elder's daily cups of tea and transmits each push of the hot water button through the Internet to inform the family that the elder is going about their daily routine. Caregivers can monitor their elder's well-being by watching for breaks in their normal tea-drinking

routine that are received in twice-daily email reports or anytime by checking on the i-Pot website. The market for the i-Pot is elders whose family live too far away to check-in with them directly. More than 2,200 families worldwide use i-Pots to send reassuring messages to people in Asia, America and Europe about their elder relatives in Japan.

➤ **Could the i-Pot catch on here? Perhaps a variation, like the i-Fridge?**

Add a few more well-placed motion sensors around the home; collect the resulting data and we can begin to see a clearer picture of how an elder is going about their activities of daily living. CareWheels (a non-profit research corporation) has used participatory design methods to engage pre-senescent people with severe disabilities as proxies for frail elders, who have similar, but generally more stable cognitive, motor and sensory challenges. They have helped to guide our research, co-development and evaluation of in-home sensor systems.<sup>32</sup> Sensors were deployed in the participants' apartments and algorithms were developed to detect and track several basic observations of daily living including: meal preparation, medication taking and sleep cycle. Changes in habitual activity and deviations from normal patterns generated alerts about possible falls, reports of missed medications, and inferred changes in a person's health status over time.<sup>33</sup>

**Example:** A sensor placed in the refrigerator reveals when a person is accessing food and drink, a sensor in the medicine cabinet indicates if medications are being taken on schedule; motion sensors in the bedroom and bathroom can reveal interrupted sleep and changes in the pattern of nighttime toileting that may indicate a urinary tract infection or a deteriorating medical condition like congestive heart failure.

This level of awareness may be accomplished using only inexpensive, wireless motion sensors. No cameras, microphones or intrusive surveillance systems are needed to communicate subtle activity and behavioral changes that may indicate an incipient problem or an immediate crisis. Sensor-based embedded assessment may be used to determine personal activity baselines and daily routines, deviations and risks associated with changes in those baselines and routines, in order to identify early disease indicators and associated risk factors.

To be most effective, a history of healthy personal baseline activity data must be collected during the opportunity space prior to a crisis in order to enable the detection of subtle changes that often precede major decline.<sup>34</sup> Since an anomaly, such as a fall or incapacitation, is a deviation from habitual behavior, it is necessary to collect longitudinal data to train detection algorithms before there is a crisis, in order to detect any unusual changes in habitual behavior that may indicate a crisis in process. Post-crisis deployment of these embedded assessment technologies misses the opportunity to implement pre-crisis detection and prevention strategies.

A sensor system called QuietCare<sup>35</sup> was one of the first consumer Telecare products to market. Designed for an aging parent living alone, it offered the promise of "peace-of-mind" to elders and their distant family caregivers. The sensor data were collected, processed and displayed on an activity dashboard, which was accessible only to designated caregivers on a secure website. Surprisingly, QuietCare and their competitors presumed that either familial or professional caregivers would be doing all the monitoring, and that elders would not be interested in accessing their dashboards to see, and possibly benefit from, their own data.

## Re-purposing Telecare Technologies for Interdependent Care (I-Care)

Something very interesting and unexpected happened when participants were shown their own data. First, they quickly began using the information to take better care of themselves. Once they were proficient at self-monitoring, they were invited to share their web-based sensor dashboard with a small group of participating neighbors to peer-monitor each other and respond to alerts if someone needed help. Sharing the data and responsibility transformed these participants from passive recipients of care services to active care prosumers who looked out for each other.

Most significantly, participation in this neighborly social health network renewed their sense of meaning and purpose in life. By sharing responsibility for the well-being of others, they became motivated to take better care of themselves, transforming isolation to relation, self-doubt to self-efficacy and depression to joy. These positive outcomes convinced us to focus on deploying technologies in ways that empower elders with their data rather than merely objectify them.

Interdependent Care, or I-Care for short, proposes to empower elders – *our absolutely greatest growing natural resource* – with the knowledge, skills, tools and connections to both give and receive care and support services from the comfort of home, using social technologies including Telecare and Time Banking to convert their untapped resources to provide Peer-Care.<sup>36</sup>

I-Care benefits overcome the perceived barriers that have prevented the adoption of many types of Telecare innovations. Peer-based monitoring addresses the cost and privacy adoption barriers for in-home wellness assessment. The cost of the sensor technology is a fraction of the cost of a professional monitoring service and first responders. Empowering elders and people of all ages living with disabilities to co-produce mutual monitoring and response services locally reduces costs substantially. Local monitoring and response mitigates the impact of false-positive alerts and the privacy concerns that have troubled the peace-of-mind sought by elders and their long-distance family caregivers, the early adopters of sensor monitoring systems.

An outstanding barrier remains: how to convince people to begin their sensor monitoring before they experience a debilitating crisis, since the ability to detect and respond to changes depends on having good historical datasets to compare to real-time data. I-Care provides an incentive by giving people the benefit of a preventive strategy, using the technology to fulfill their desire to serve a deeper purpose and have a sense of belonging<sup>37</sup> in the near term by “paying it forward” while banking their baseline data and the goodwill engendered over the long term.

## Re-purposing gerontechnology for Connected Aging

Gerontechnology, or simply gerontech, is a contraction of the terms gerontology and technology. Gerontology (which comes from the root meaning “to become ripe, to grow old”) is the scientific study of the biological, psychological, spiritual and sociological phenomena connected to aging. Technology (root meaning “the systematic treatment of an art, craft, or technique”) harnesses scientific knowledge to solve practical problems. Gerontech encompass both the subjective art of growing ripe and the objective science of resolving the practical challenges of aging, by utilizing appropriate technologies to empower elders and caregivers to participate optimally in service exchanges. The reference section lists several good sources of current gerontech information.<sup>38</sup>

Innovative geriatric physician Allan Teel<sup>39</sup> is a pioneer in Telecare, integrating gerontechnology into high-tech, high-touch circles of caring (the Maine Approach). He is developing an engaging model of in-home care that fully embraces elder empowerment, using technology and peer-care to support elders at home for a fraction of the cost of institutional care:

*The take-home message is that the Maine Approach has proven it is robust enough to address comprehensively the complex needs of frail elders. A bone fide alternative to the residential-care facility now exists. Remote monitoring, interactive technology, a sprinkling of high-quality professional staff and a few dedicated personal-support staff can handle complex elder members' needs in their own homes at 10% of the cost of existing residential-care options. ...As "I" begin to explore and employ the options available to "me," I become more empowered, more confident, more in control of my own life ...The value that this paradigm shift brings to our whole society is almost incalculable. ...If we can harness the vast potential of this large [elder] demographic segment and convert them from either recipients or bystanders to full participants, the possibilities are endless...*

*Do the math. Try it in your community. You will be astounded.*

Dr. Teel's Maine Approach and Professor Cahn's Time Banking share common objectives: engaging people as assets regardless of their age or barriers such as disability, and fostering greater interdependence through reciprocal peer and intergenerational exchanges. In this way, they both transform the "problem" into an essential part of the solution. Taken together, their complementary methods provide a powerful new hybrid care model that can efficiently convert surplus human capital into social capital. By harnessing prosumer power to build networks of reciprocal interdependence, we leverage a multiplier effect that effectively increases the value for all with the addition of every new prosumer. This paradigm-shifting innovation may drive the adoption of gerontechnology by re-purposing existing technologies from "ends" in themselves to the "means" for elder empowerment – just in time to meet the urgent needs of our aging society.

Emerging gerontechnologies like Telecare will empower Boomers, elders and their caregivers to address a comprehensive range of medical, health, social, and functional needs, using a growing array of Internet-based technologies and mobile devices to support their desires to age in place. The Connected Aging Model<sup>40</sup> defines successful aging as empowering the whole person-centered care ecosystem through the effective use Internet-enabled technologies by supporting physical and cognitive health, wellness and prevention, functional limitations and chronic disease management, and improving social connectedness to friends, family and community.

Broad adoption of gerontech will be driven by the increasing integration of connective services and decreasing cost of Telecare enabling devices. As the computing power and connectivity of big desktop PCs shrinks along with the price, we can begin to connect in powerful new ways and carry our connections wherever we go. Mobile devices including smart phones, iPads and tablet PCs serve as handy tools to keep in touch with family, friends and professional care providers. Health care and aging service providers are adopting Telecare to help integrate and enable the emergence of a cohesive concept of whole-person-oriented, community-based, connected aging to alleviate resource shortages due to the shrinking pool of professional providers and family caregivers. The value of Connected Aging is already resulting in reduced use of excessive health care services and improvements in care delivery, quality-of-life, and satisfaction.

Connective technologies offer great benefits to elders who wish to preserve their independence and cultivate interdependence by engaging in rich connections and meaningful social relations.

**Example:** Video conferencing now fulfills the long awaited dream of having face-to-face telephone conversations. Smart phones, iPads and tablets allow one to literally cradle the other's face while holding the device in ones hands, which feels so much more intimate than looking at a computer screen. This is becoming the next best thing to being there for technologically savvy elders and their families.

## Current Aging Service Models and Telecare Adoption

- **Who among the variety of current elder service providers will be the early adopters of Telecare innovations?**
- **How may we begin to deploy gerontechnology tools now to benefit elders who are aging in place?**

The following 4 aging service models, which may benefit from Telecare adoption, are examples of service providers that have national associations and member networks that develop standards and propagate best practices.

### Continuing Care Retirement Communities (CCRCs)

CCRCs have made a long term commitment and investment in applied research, pilot projects, member education and technical support to promote the adoption of gerontechnology, primarily in residential settings. CCRCs provide a continuum of care as a resident's health changes over time, from independent living apartments, assisted living, to skilled nursing and memory care, although not all residents have the need to move through the continuum. Most CCRCs require a one-time entrance fee ranging from \$250,000 to upwards of \$700,000 plus monthly service fees of \$2,000 to \$4,000 or more.<sup>41</sup>

CCRCs Without Walls are less expensive alternatives often managed by staff affiliated with an existing CCRC. They offer home-based programs and services based on the continuum of care concept to home-dwelling elders in their surrounding communities who can't afford or do not wish to live in a CCRC, but who want access to a variety of health care and support services that could delay or even prevent their need to leave home, plus a well defined path to a well-known CCRC should they need it.

**Example:** LeadingAge™ established the Center for Aging Services Technologies<sup>42</sup> to expedite the development, evaluation and adoption of emerging technologies that can improve the aging experience by helping elders to maximize their independence, support the needs of professional and family caregivers and reduce our nation's health care costs. A recent Technology Adoption and Utilization Survey found that leading member organizations have high adoption rates for wander management technologies (88%) and emergency response systems (82.6%). A smaller proportion (34.5%) provides residents with simplified e-mail systems, while about 18% use telehealth or remote patient monitoring technologies and 5% provide residents with video conferencing capabilities.<sup>43</sup>

CCRCs have been early adopters of technology, with high adoption of technologies that help manage residents and respond to emergencies, but lower rates for technologies that provide social connectedness and support at home. This is understandable, since CCRCs are the leading organizations in campus and facility based aging services. They are companies with substantial real estate investments which have proven to be sensitive to the vagaries of financial markets, Medicare and Medicaid reimbursement rates, changing regulatory requirements and low-paid employees with high turn-over rates. CCRCs are not likely to scale in proportion to the aging demographic shift to meet the needs of our aging society, since most people won't be able to afford the high entrance costs and monthly service fees.

## Geriatric Care Managers

A Geriatric Care Manager (GCM) is a health and human services specialist that helps families who are caring for older relatives. Geriatric Care Managers are educated in any of several fields related to care management, including but not limited to, nursing, gerontology, social work, or psychology, with a specialized focus on issues related to aging and elder care.<sup>44</sup> When GCMs learn how to use gerontechnology to improve the client's quality-of-life by increasing the quality, efficiency and affordability of care, their profession may expand from its current niche market into the mainstream of in-home care management services.

**Example:** GCMs may use technology to help their clients age more safely at home and ease some of the burdens of caregiving, by improving communication and coordination between the family and professional care team. The GCM is in a position to recommend affordable technologies to help their clients live at home for as long as possible.<sup>45</sup> Clients will experience prolonged independence, a greater sense of security, improved health and quality-of-life, plus more opportunities for social connections and interaction. Families will appreciate greater peace of mind about their loved one's safety and well-being because GCMs will be empowered to detect emergent problems and intervene before crises occur.

Presently, GCMs are usually hired by a family only after their elder has experienced a crisis, often too late to benefit from the preventive strategies enabled by sensor-based assessments. Following a crisis, such as a fall or hospitalization, opportunities for pre-crisis detection and prevention have been missed. This is a very stressful time to try implementing new technologies and the most difficult time to begin learning how to use them. GCMs tend to be late adopters of technology. By adopting Telecare and using gerontechnology proactively, they and their clients will be able to get in front of crises to avert needless suffering, reduce emergency room trips and prevent avoidable hospital (re)admissions.

## Intentional Communities

Cohousing, Villages and Naturally Occurring Retirement Communities (NORCs) are examples of community-based organizations. While the operational models are different, they all seek to bring services to home dwelling elders rather than move people into facilities to receive services. They promote independence with a variety of methods including, social engagement, mutual assistance, support and volunteerism.

**Example:** The Village to Village Network<sup>46</sup> is a national organization that has helped to propagate over 130 Villages across the country. These Villages offer their members services, programs and activities that revolve around community building, social, cultural, and educational activities, member-to-member volunteer support and vetted referrals offered through a concierge service model that promises: “One call does it all!” Villages average 150 members with annual membership fees ranging from \$100 to \$1,200.

One of the major challenges faced by Villages is long-term sustainability. Already, several Villages have closed or abandoned their development efforts and most Villages studied in a recent survey<sup>47</sup> reported challenges related to funding or organizational functioning. Villages rely heavily on unstable funding sources including membership fees, gifts and grants, creating continuous pressure to seek or retain members and develop additional external funding sources. Because Villages depend so heavily on member involvement, elders with reduced physical, psychological, cognitive or financial capacity may find participation difficult. This situation is likely to worsen in time as members grow older and frailer, requiring more resources and care services to maintain an acceptable and affordable quality-of-life at home.

- **How may Intentional Communities begin to deploy gerontech tools now to prepare for the inevitable challenges of serving frail elders who are trying to aging in place?**

Technologies including video conferencing, mobile and remote monitoring systems that can connect people into virtual villages and deliver affordable care into the home will offer the best methods to fulfill the wishes of intentional community members to continue aging in place for as long as practical and avoid institutionalization if at all possible. Teaching elders how to peer-monitor and serve as each-other's first responders will create a much higher level of intentional community. I-Care could become a boon for intentional communities like NORCs and Villages as their members inevitably grow older and require higher levels of support than services can presently deliver. Empowering members with Telecare and Time Banking systems to co-produce and remunerate interdependent care services will help them achieve affordable mutual support.

## **Senior Centers**

The National Institute of Senior Centers supports America's 11,000 senior centers through best practices, professional development, advocacy, research, national standards and accreditation.<sup>48</sup> Senior centers were created to support the health, well-being and independence of older adults. They receive federal funding under the Older Americans Act and serve about 10 million elders and their families yearly with information on aging, family assistance, Meals on Wheels and other services to homebound elders. According to an America's Health Rankings commentary, their full potential in community health has not been achieved due to a lack of vision and investments in health promotion and preventive services.<sup>49</sup>

- **How may senior centers attract Boomers to help realize their potential?**

Boomers typically don't self-identify as seniors – that's their parents, not them. Senior centers may have to change their names if they want to attract Boomers who are not joining presently.<sup>50</sup>

This is essential to the viability of the senior center model because the “young-old,” roughly age 65 to 75 often serve as volunteers for the “old-old,” a group that tends to have more physical needs and functional impairments. While many senior centers are blessed with an abundance of volunteers, providing them all with meaningful opportunities to participate remains challenging. Combining Telecare and Time Banking creates new opportunities and incentives for Boomers to connect and pay it forward in their communities, supporting these centers to remain the thriving sources of assistance, information and services for today’s elders, while growing to meet the Boomer’s emergent needs when the time inevitably comes that they too desire these resources.

## **I-Care: greater Independence through Interdependence**

We cherish our myths of independence more than the truth of our fundamental interdependence. Who knows who grows our food or sews our clothes? From childhood to elderhood we rely on the gifts of nature and people to nourish body and mind. While some services may be purchased, fulfillment of our most important and intimate needs depends foremost on trusting relationships.

Giving often evokes feelings of pleasure, while receiving may produce feelings that range from pleasure – through ambivalence – to discomfort, depending on the circumstances. Care giving and receiving are especially sensitive to social customs and circumstances. Reciprocal exchanges respect each person’s contributions, which creates a positive sense of mutual obligation. Whether paying it forward or expressing a debt of gratitude, reciprocity creates meaning by engendering the enduring relationships and deepening trust that lead from familiarity to friendship.

### **Motivation for I-Care Innovation**

CareWheels’ research was motivated by prior studies that have shown the benefits of giving people access to their data and information about their daily routines, which can help them manage their health-related behaviors.<sup>51,52</sup> Web-based feedback has been effective to improve self-management, in part because it can help people assess their self-efficacy, enabling them to set achievable goals and manage progress toward those goals.<sup>53</sup> Socially-mediated feedback can amplify these effects, leading to further improvements in health impact.<sup>54</sup> Social interactions can also enhance feelings of belonging<sup>55</sup>, sense of purpose and meaning<sup>56</sup>, and sense of security.<sup>57</sup> These benefits multiply when elders engage in mutual care services that support their shared goal to age in place at home.

Elders and Boomers who engage in reciprocal support may enhance their health and well-being while simultaneously helping to solve community problems. Reciprocity, especially the pay it forward kind, is effectively a form of volunteerism based on enlightened self-interest. When individuals volunteer, they not only help their community but also experience better health in later years, from greater longevity and higher functional ability to lower rates of depression.<sup>58</sup> Research on aging shows that volunteering slows the decline in health and functioning levels, slows the increase in depression levels, and improves mortality rates for those who volunteer.<sup>59</sup>

- **Given these great personal and social benefits, how may we encourage more people to practice I-Care and participate in health promoting interdependent relationships?**

We can begin to leverage the connective power of the Internet to build social support systems that help to coordinate home care teams composed of elders, their families, friends, volunteer and professional care givers. Moving the primary centers of care away from the clinic and hospital, back to the home and community, will make health care safer, more affordable and available for everyone. Safer by reducing our exposure to nosocomial infections from multi-drug resistant organisms found in hospitals, more affordable by increasing focus on early detection and prevention while reducing our dependence on crisis intervention, and more available by empowering people and their care providers to expand the range of services available at home.

## **Disruptive Health Innovations Shift Care Homeward**

Disruptive innovation in health care is occurring quickly at two points. Point-of-Care disruptions happen when treatments that were previously performed in a hospital may now be done at home. Provider-level disruptions happen when diagnoses and procedures that previously required physicians can now be done as self-care because methods have been codified and procedures automated with technology. Examples include the home pregnancy test and digital blood glucose monitoring kits, which make it easier for people with diabetes to care for themselves at home. The development of rules-based care procedures, and technologies that embody those rules in practice, enable the progression of care from professionals in hospitals to self-care at home.<sup>60</sup>

Disruptive innovations (like email and social networking services) harness the network effect of reciprocal interdependence to achieve much faster adoption rates. Prosumer-level disruptions, a third point of innovation, will happen when we harness gerontech empowered prosumers to build social health networks and provide reciprocal care services that previously required professional providers. Prosumer-level, Provider-level and Point-of-Care disruptions will produce dynamic synergies that propagate social health networks as each new prosumer adds value to their whole network. This paradigm-shifting innovation may drive the rapid adoption of gerontechnology by re-purposing existing Telecare technologies to empower Boomers and elders to practice I-Care, offering the possibility of a truly scalable solution to the Age Wave demographic megatrend in time to meet the growing health care needs of our aging society.

- **How may we leverage the Age Wave, Information Revolution and Financial Instability megatrends to mitigate their convergent mega-impacts?**

Boomers intending to age in place and enjoy a good quality-of-life at home in their communities for as long as possible should begin investing in intentional community development now, which offers the best hedge against Financial Instability risks associated with speculative investments, underfunded pension plans and unreliable entitlement programs. These safeguards have become so intertwined that they may all succumb to financial contagion and collapse in the event of another global financial crisis.

To build our core wealth, we must engage in exchanges that appreciate the value of social credit, harnessing our surplus human capital to build up our reserves of social capital. Telecare and Time Banking empower us to co-produce and exchange I-Care services. These exchanges are local by necessity because they serve real needs in our communities. Their production cannot be outsourced nor their value inflated away.

The take-home lessons of the Age Wave and Financial Instability are that their impacts are local. Our independence and well-being depends more on our commitment to work together than on our dependence on distant institutions. When we begin to prepare for aging in our communities, we will also be producing locally the basic necessities of life. This preparation is essential now because localization provides a cushion against the impacts of crises in the larger economy.

Think globally, act locally – the Boomer’s environmental motto – reminds us that our health, like the Earth’s, depends on the choices we make in our own communities. The 75 million American Boomers are part of the 450 million post-World War II baby boom whose huge numbers provide extraordinary leverage to drive these converging global megatrends. Whether the challenges are solvable problems or intractable predicaments depends crucially on how we choose to act now – during this pre-crisis opportunity space.

***Will you still need me, will you still feed me?*** <sup>61</sup>

### **The Allegory of the Long Spoons** <sup>62</sup>

A Sage traveled from town to town delivering sermons about the importance of compassion and respect for one's fellows. He told of a dream where he found himself in hell and described the horrifying vision: Row after row of tables were laden with platters of sumptuous food, yet the people seated around the tables were pale and emaciated, moaning in hunger. As he came closer, he understood their terrible plight. Every person held a 4-foot long spoon, full of delicious food, but their arms could not bend enough to bring it to their own mouths. So they suffered in vain.

Next, the Sage’s dream found him in heaven where, to his surprise, he saw the same setting he had witnessed in hell: row after row of tables laden with delicious food. But in contrast to hell, the people here in heaven were sitting contentedly, feeding each other across the tables with their 4-foot long spoons, enjoying their delicious meal in good company. Suddenly he understood: heaven and hell offer the same conditions. The practical difference is how we treat each other.

The low-hanging fruit of I-Care are within our reach to serve the emergent Age Wave. The table is set, the ingredients are here. When we choose to use what we have we will have what we need.



### **Attribution**

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