



The future of aging

What impact might the expansion of health span
have on society?

About the Deloitte Center for Health Solutions

The source for fresh perspectives in health care: The Deloitte Center for Health Solutions (DCHS), part of Deloitte LLP's Life Sciences and Health Care practice, looks deeper at the biggest industry issues and provides new thinking around complex challenges. Cutting-edge research and thought-provoking analysis give our clients the insights they need to see things differently and address the changing landscape.

Connect

To learn more about the DCHS and our research, please visit www.deloitte.com/centerforhealthsolutions

Subscribe

To receive email communications, please visit www.deloitte.com/us/LSHC-subscribe

To subscribe to our blog, please visit <https://blogs.deloitte.com/centerforhealthsolutions/>

Engage

Follow us on Twitter at: [@DeloitteHealth](https://twitter.com/DeloitteHealth)

Engage with us on LinkedIn via [ConvergeHEALTH](#) by Deloitte

The health industry is on the cusp of a major transformation that will affect all stakeholders. Incumbent players can either lead this transformation as innovative and well-connected market leaders or they can try to resist this inevitable change. A wide range of companies—from inside and outside of the health care sector—are already making strategic investments that could form the foundation for a future of health that is defined by radically interoperable data, open and secure platforms, and consumer-driven care. For more information, please visit **Deloitte.com**.

Contents

Executive summary	2
Introduction	6
What will health care “treat” in the future?	8
How will the future of health change how people work, retire, and pay for their later years?	12
How will the future of health change where and how people live?	16
How can companies innovate and develop products and services for the future of health and aging?	21
Conclusion	23
Endnotes	24

Executive summary

WHAT IMPACT MIGHT the expansion of health span—the amount of time that one is healthy in life—have on society? The future of aging could look radically different than the experiences people have today. A future of health focused on preventing disease can change people’s experiences for the better and create opportunities for today’s life sciences and health care stakeholders.

As described in *Forces of change: The future of health*, by 2040, we expect the consumer will be at the center of the health model. The onset of disease, in some cases, could be delayed or eliminated altogether—cancer and diabetes could join polio as defeated diseases. In this future, the way people age could look very different than today. Old age would not be defined by disease and functional limitations, but, rather, extended vitality. Concepts around work and retirement could also shift as more years are added to the middle of life. And instead of having entire communities dedicated to housing older adults, people could remain—and continue to be engaged—in the communities of their choice, amongst people of all ages and supported by care-everywhere technology.

We’ve made massive strides in lengthening life span in the last 100 years. But a future focused on maintaining health and well-being and supported by radically interoperable data on health and lifestyle could extend life even further. More likely, however, is that it could lengthen the time that people thrive and prosper. We explored this deeper by discussing three questions with experts in aging services, policy, innovation, and technology:

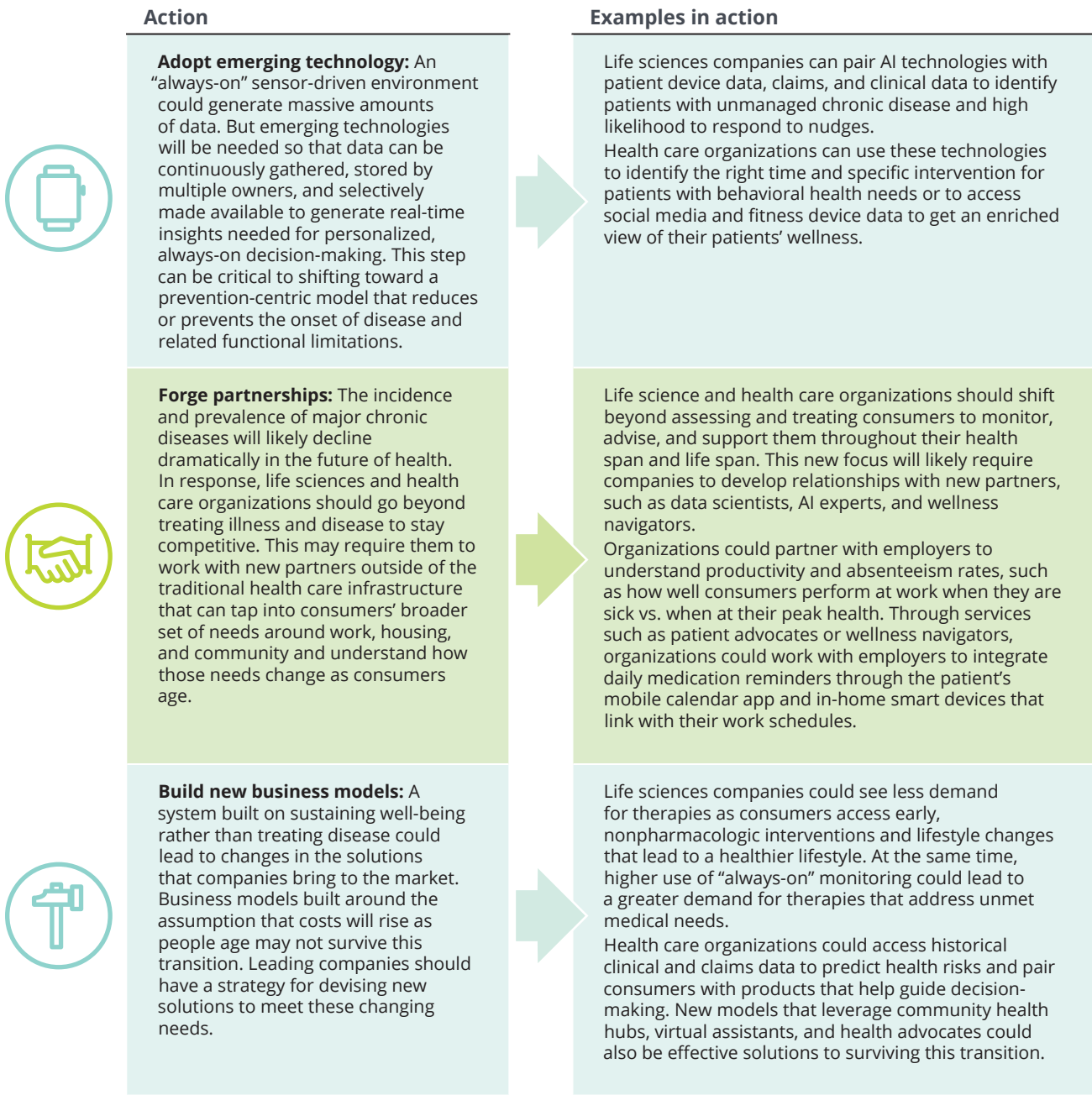
- **What will health care “treat” in the future?** In the future, the availability of data and personalized artificial intelligence (AI) could enable precision well-being and real-time microinterventions that allow us to get ahead of sickness and far ahead of catastrophic disease. But, even if we discover cures for the diseases that ail the population today, different ones will likely emerge in their place. Some of the experts we spoke to believe that as we develop more precision treatments, cures, and preventive medicine techniques for today’s diseases (for example, cancer, heart disease, and diabetes), health care will need to shift to focus on mental and behavioral health, suicide, loneliness, and social isolation throughout the life span and especially as people age.

- **How will the future of health change how people work, retire, and pay for their later years?** A health care system focused on preventing disease could mean that work and income need not pivot around saving for future health and long-term care costs. Moreover, fewer people of all ages would need to leave the workforce or pay others to care for loved ones with failing health. This could lead to a more flexible, open mindset around what “work” and “retirement” mean. Health care and life sciences companies should adapt their products and services as a result, as many today approach the pre-65 and post-65 populations with different solutions.
- **How will the future of health change where and how people will live?** It is said that home is where the heart is. In the future, home will also be where heart health is. Smart homes, enabled by the Internet of Things (IoT), could be so in tune with daily routine that they will do the work for people by using equipment such as remote-monitoring biosensors. Enabling technology will not stop when people step out of their homes, however. In the future, communities and services could be set up to support people of all ages and needs and allow residents to naturally incorporate health and well-being into their everyday lives. The combination of these can allow more people to live in the setting they desire as they age.

FIGURE 1

Attaining this future will likely require action on behalf of today’s companies

Life sciences and health care organizations should begin taking steps today with this vision for 2040 in mind. There are many ways to get there, but some of the most critical steps can be to adopt emerging technology, forge partnerships, build new business models, and go beyond care.





Action

Go beyond care: Supporting people's changing needs—social, emotional, housing, and more—as they age and meeting them in the places they spend most of their lives (their homes, communities, work, retail settings) will likely be critical as companies shift to focus on preventing disease and supporting well-being.

Examples in action

Health care organizations should develop new partners (such as retailers, and local and state governments) to leverage location-based data and eligibility and benefits data to determine lowest cost sites and communicate recommendations in real time. Life sciences companies may be able to partner with those same stakeholders to use location-based data to deliver real-time alerts to patients at high risk of contagious illness (such as the flu) and steer them to locations to receive vaccines or other prevention-focused medications.

As more people work outside of traditional employment settings, fewer could have access to traditional employer benefits (short-term and long-term care insurance, 401(k), pensions). While the need for these arrangements may decrease over time as people stay healthy longer, they will still need a safety net. Health care organizations should pair data and technology to identify those needs and communicate solutions using convenient and preferred engagement channels.

Source: Deloitte analysis.

Introduction

Society is experiencing the challenges of our own success

Health care has been so successful at treating *disease* that today we have more people living with (instead of dying from) chronic disease than ever before. Compared to the early 1900s, health care today is much better at extending how long people live after they are diagnosed.

METHODOLOGY

To get insights on what the future of aging might look like, we spoke with 30 individuals in aging services, policy, innovation, and technology. We discussed how aging might change in the future, what is currently happening that points to those changes, and which societal, policy, scientific, technological, and economic factors will likely change along the path to 2040. From our interviews, we found several themes that we will highlight throughout the paper. In addition, we conducted secondary research to identify case studies of startups and companies doing work today that provide insights into the future.

This phenomenon is relatively recent. In 1900, the average life expectancy at birth in the United States was 47 years.¹ Today, the average person in the United States can expect to live well into their 70s, and women, into their early 80s.² As these gains only happened over the last 100 years, we have had little practice with what that means for society and how people age. As an example, the first Social Security recipient, Ida May Fuller, received her first check on January 31, 1940 at the age of 65. She lived for another 35 years to age 100 and collected a total of US\$22,000 in Social Security benefits after paying in less than US\$25 into the system.³ That she would live so long was not expected!

While longevity has increased in the last century, the years we have gained were not added to the end of life. Instead, says Dr. Laura Carstensen at the Stanford Center on Longevity, those “extra” years have been added to the middle of life.⁴ But still today, the average health span (age 63)—the amount of time that one is healthy in life—stops more than a decade short of the average life span (age 79).⁵ While some think we have reached a maximum life span for the human race, we could see more years “added” to the middle of life in the

“There is no such thing as a ‘silver tsunami.’ If you map out what happens to demography for Gen X and the millennials, it looks exactly like the boomers. It’s not just boomers and then it’s going away... We need solutions for the next 60 years.”

— *Nonprofit foundation leader*

future as technology and treatment advancements catch disease early or prevent it altogether.⁶ What might the expansion of health span have on society? This is the central question we will explore.

Silver tsunami or permanent sea change?

As Ashton Applewhite, a leader in the movement to dispel age discrimination, points out in her Ted Talk, “Longevity is here to stay.”⁷ The generations following the baby boomers are large and will likely live just as long (if not longer). Take the millennial generation: As of July 1, 2016, there were 71 million millennials living in the United States. The same year, there were 74 million baby boomers. And, this year, millennials are expected to outnumber baby boomers as immigrants add to their numbers.⁸ And just as the baby boomers are rejecting many of the “senior-focused” products they are the target of, the generations following them may also expect products and services to be built at the outset with features that meet their changing needs as they age. Some businesses are already catching on to this, which is why, for example, Apple Inc.⁹ has added a fall detection feature into its Apple Watch Series 4[®] instead of building an app as an add-on feature.

This paper will focus on just a few topics, but we acknowledge that as consumers age they will—and already are beginning to—disrupt everything from travel and entertainment to retail, broader built environment, cities/suburbs, and other industries. Businesses today should innovate or risk disruption. The leading business models should be based on *holistic* solutions that can *adapt* to the challenges of many generations to come. We’ll explore the future by discussing key themes that we highlight through the lives of three individuals:



Larry recently lost his wife and is struggling to adjust to a new normal by figuring out how to engage socially in addition to managing his type II diabetes and renal insufficiency.



Chase is managing a chronic condition and relies on a combination of technology and behavioral nudges to stay on track.



Dana has few financial resources and struggles to prioritize her own personal health.

What will health care “treat” in the future

AS WE DEVELOP more precision treatments, cures, and preventive medicine techniques for today’s diseases (for example, cancer, heart disease, and diabetes), health care should shift to a greater focus on mental and behavioral health, suicide, loneliness, social isolation.

By 2040, we expect data and the consumer to be at the center of the health model. Interventions and treatments in the future are likely to be more precise, less complex, less invasive, and cheaper. Care-everywhere could be enabled by the IoT, electronic devices, and wearables, and the availability of data and personalized AI will enable precision well-being and real-time microinterventions that allow us to get ahead of sickness and far ahead of catastrophic disease. In this future, the health care industry will have shifted its focus to identifying risk factors and genetic susceptibility to drive toward prevention and offering curative solutions rather than treatment and maintenance.

Imagine in 11 years, scientists develop a vaccine to prevent Alzheimer’s and in 15 years, a targeted treatment for the 10 leading types of cancer. Imagine remote health monitoring and telehealth are the norm, rather than the exception, as they are

In 2040, Chase is 40 years old and has been living with indolent non-Hodgkin lymphoma for five years.



Through a combination of sensors embedded in his body and environment and predictive analytics, he is able to manage his disease with purposeful shifts in his routine and few compromises to his value and lifestyle. Recent readings make it clear that while his condition has progressed, his lifestyle hasn’t kept up. Chase’s health advocate is notified and is asked for permission to adjust his medication and prescribe a wellness routine that combines location-based fitness activity recommendations, a healthy food service, and a personal coach to help him develop better habits. Nudges integrated into his virtual schedule help Chase adjust to this “new normal.”

“Social isolation and loneliness are not the same thing. There is overlap, but they are not the same thing. We need a much more thoughtful approach to social isolation and loneliness than what is in place today. You can be lonely in a crowded room.”

— *Nonprofit foundation leader*

today. This could drastically change the way people physiologically age as their chronological age increases. But, we can generally expect that even if we discover cures for the diseases that ail the population today, different ones will emerge in their place. This will require solutions and services structured around today’s primary killers to shift focus in the future.

Some of the experts we spoke to believe that as we develop more precision treatments, cures, and preventive medicine techniques for today’s diseases (for example, cancer, heart disease, and diabetes), health care will need to shift to a greater focus on mental and behavioral health, suicide, loneliness, social isolation. These experts believe that depression and loneliness, mental health, and behavioral health conditions caused by social determinants will be the epidemics of the 2020s and 2030s. This trend speaks to the larger need to treat the holistic person beyond their physiological needs.

Change is emerging: Suicide, social isolation, and loneliness epidemics on the rise

Already today, we see evidence of this shift. In the United States, suicide rates have increased more than 25 percent since 1999.¹⁰ Recent evidence

suggests that even young children are being impacted. Emergency department visits for suicide attempts and suicidal ideation among children under the age of 18 increased 92 percent from 2007 to 2015—and more than 40 percent of those visits were among children aged 5–11.¹¹ And today, Generation Z individuals (those born between 1995 and 2012) are more prone to emotional distress, suicide, and major depression than the millennial generation was at the same age.¹² Neolth, a digital tool, is trying to tackle one angle of this by adding stress management as part of care management (see case studies).

Researchers have found that people with weaker social ties were 50 percent more likely to die during the observation period.¹³ Put differently, this means that people with strong social networks—higher quality of social relationships—are more likely to live longer. An entire industry dedicated to treating social isolation and loneliness (see the sidebar, “Social isolation and loneliness”) has emerged as a solution. For example, Element3 Health has created solutions to improve physical, social, and mental activity in individuals (see case studies). Governments and regulators are also joining in the battle. In 2018, the United Kingdom appointed a minister for loneliness, and the US Senate Special Committee on Aging held hearings on isolation and loneliness back in 2017.¹⁴

Bridging the gap: Getting to 2040

What if companies—health care, retail, and others—organized their business models around treating the entire person? Some early movers and innovators are doing just that—shifting to focus beyond physical health (see the sidebar, “Spotlight: Early movers to watch”). If they are successful, they could fundamentally change the way people age in the future.

DEFINING SOCIAL ISOLATION AND LONELINESS

Social isolation: “An objective measure of the number of contacts that people have. It is about the quantity and not quality of relationships.”

Loneliness: “A subjective feeling about the gap between a person’s desired levels of social contact and their actual level of social contact. It refers to the perceived quality of the person’s relationships.”¹⁵

SPOTLIGHT: EARLY MOVERS TO WATCH





Element3 Health creates solutions to improve physical, social, and mental activity, with the goal of promoting wellness and reducing health care spending for adults 50 and older. Element3 Health’s platform, GroupWorks, connects individuals to group activities around their passions that bring enjoyment, fulfillment, and purpose to their lives. GroupWorks connects individuals based on their social-recreational interests—ranging from arts and crafts to sports to outdoor adventure. The company’s engagement platform is currently onboarding 1.5 million members across more than 120 passions.¹⁶ Element3 Health also offers its product to Medicare Advantage (MA) plans. MA plans can leverage GroupWorks to engage their members in more physical and social activity, potentially improving their health and increasing their customer satisfaction. While this tool is targeted at older adults today, expanding the focus to younger consumers in the future could help delay or prevent the onset of conditions caused by social isolation and loneliness.

Neolth is a digital tool that helps individuals find the right stress management practices to improve their health. The tool identifies five practices each month for the user, and also allows the user to track their practices, report feedback, and see progress over time.¹⁷ The personalized stress management plan is created by medical experts and updated from the user’s feedback. By requesting patient input, the tool promotes patient autonomy. The types of stress management practices include: journaling, breathwork, guided imagery, creative art, mindfulness, cognitive behavioral therapy, and meditation.¹⁸

The **SAIDO Learning** method—a treatment consisting of a series of arithmetic, reading, and writing exercises—has been shown to slow the progress of dementia symptoms. The method involves a caregiver (called a “supporter”) who is trained to work with two older adults (called “learners”). The supporter engages the learners in a series of exercises five times per week that last 20 to 30 minutes. Research has shown that SAIDO Learning improves both quality of life (more smiles, higher energy and motivation) and brain function, as measured by two standard-use cognitive tests: the Mini-Mental State Examination (MMSE) and the Frontal Assessment Battery at Bedside (FAB).¹⁹

FIGURE 2

Attaining this future will likely require action on behalf of today's companies (cont'd)

Action	Examples in action
 <p>Adopt emerging technology: Stakeholders should take advantage of new technologies to enable the “care-everywhere” concept. Predictive analytics are just the first step in this direction. Beyond that, transactions can be supported by cognitive computing capabilities, which could enable constant and real-time adaptation of targeted solutions.</p>	<p>Health plans may develop products that are hyperpersonal and allow consumers to customize what they purchase. Using insights generated from multiple data sources fed into AI-driven platforms, health plans can use claims, clinical, financial, and location-based data and orchestrate personalized outreach to suggest products based on a person's individual health care needs and adapt to changes in those needs as people age.</p> <p>Life sciences companies could pair patient device data and machine learning to identify wellness activities to help consumers manage their vital signs.</p>
 <p>Forge partnerships: The incidence and prevalence of major chronic diseases could decline dramatically in the future of health. In response, life sciences and health care organizations should go beyond treating illness and disease to stay competitive. This may require them to work with new partners, such as data- and consumer-oriented companies from outside the industry.</p>	<p>Health care providers should shift beyond assessing and treating consumers to monitor, advise, and support them throughout their health journey. This new focus may require companies to develop relationships with new partners, such as data scientists, AI experts, and wellness navigators. Organizations may also need to tap into lessons learned by the longevity economy—businesses focused on the economic upside of the older adult population and on their needs.²⁰</p>
 <p>Build new business models: A system built on sustaining well-being rather than treating disease could lead to changes in the solutions that companies bring to market. Business models built around the assumption that costs will rise as people age may not survive this transition.</p>	<p>Life sciences companies could see less demand for therapies as consumers access early, nonpharmacologic interventions and lifestyle changes that lead to a healthier lifestyle. At the same time, higher use of “always-on” monitoring could lead to a greater demand for therapies that address unmet medical needs.</p>
 <p>Shift mindset: Moving away from a focus on closing gaps to preventing gaps can be a critical step. In the future, care coordination will likely be predictive and focused on nonclinical aspects of care.</p>	<p>Providers could employ well-being and prevention specialists to prevent disease and maintain an overall focus of holistic well-being. Their services should be aimed not only at detecting physiologic changes, but also at identifying when individuals face other challenges that may impact their health (for example, job loss leading to stress, loss of a loved one leading to depressive symptoms). They should also deliver targeted content based on an individual's predicted health needs and location using preferred communication channels.</p> <p>Future products from life sciences companies could build in proactive patient adherence capabilities (for example, data from a pill with a sensor that monitors and reports physiologic changes could be used to make real-time decisions regarding treatment plans).</p>

Source: Deloitte analysis.

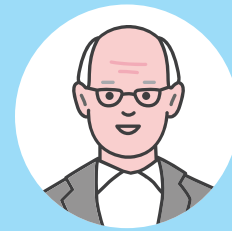
How will the future of health change how people work, retire, and pay for their later years?

A FUTURE WHERE THE length of time during which people are healthy and free of functional limitations could mean that people have the physical and mental stamina to work later in life. It might also mean fewer people would need to leave the workforce due to caregiver demands and financial needs in later life would change.

Adding more years to middle life could mean that new life phases arise. It could also lead to a more flexible, open mindset around what “work” and “retirement” mean. As Dr. Carstensen has said, “We should be planning for marathon careers that last longer but have more breaks along the way for learning, family needs, and obligations outside the workplace.”²¹ It may also mean fewer people of all ages would need to leave the workforce or pay others to care for loved ones with failing health, a major stressor for today’s workforce.

In such a world, work and income may no longer pivot around saving for future health care costs. Today, the average 65-year-old couple needs to save nearly US\$300,000 to pay for their health care costs in retirement.²² Financial planning is often focused on preparing for health care, long-term care, and funeral costs that people will incur when they are older. This could change as health

In 2038, at 68, Larry lost his wife the same year he retired. She was the epicenter of his health management, from cooking meals to



choosing providers to granting health data permissions. Fast forward to 2040, Larry is 70 and has had a hard transition. He finds himself bored and missing his wife. He wants to keep his mind occupied and misses the intellectual challenges that work brought him. Larry’s virtual assistant notices a downtick in his mood and his health advocate recommends he join a local social club that allows him to get to know others who have similar interests, careers, and backgrounds. The club is an extension of a larger virtual affinity network, which Larry also joins. A member of the group introduces him to a virtual mentoring program that allows Larry to share his industry expertise with those just starting their careers. He gets paid for his engagement but doesn’t do it for the money. He likes giving back and also enjoys the intellectual challenge of solving problems and learning about new trends and technology from his younger colleagues.

care shifts to prevent illness and treat the whole person. It could also mean that the career trajectory could become more fluid. Needing less in savings to spend on health care in later years could allow people to dial up work when other parts of life do not demand as much attention and dial work down at other times, for example, having children and seeking additional education.

Change is emerging: Working longer, but out of desire rather than need

As health care allows more people to stay healthy longer, many people are working longer and taking advantage of the gig economy. Employers have also begun to focus on their role in supporting the health and well-being of their workforce and in employing older workers.

While Dr. Carstensen's argument that people shouldn't start working full time until they are in their 40s may be a difficult concept for some to grasp, many people are already making changes to the way they think about work.²³ For example, some are working longer because they wish to (and many also due to financial need). Age Friendly Advisor surveyed people age 50 and older who are still working to understand why they have not retired. Sixty-four percent of the respondents said that they remained in the workforce because they "both need and want to work." Only 22 percent said they stayed because they "need to work."²⁴

Many people of all ages are also beginning to participate in the gig economy as they seek new ways

to structure their life around work. Recent estimates suggest that by 2020, 42 percent of self-employed individuals are likely to be millennials. People who choose this path tend to have distinct personality differences from those who work in more traditional settings. They rate themselves as being "dependable and self-disciplined, extroverted and enthusiastic, and being open to new experiences."²⁵ This population could be more focused on creating purpose out of their careers well into their later years, work that Encore.org is also trying to advance (see case studies).

Employers are another group who are beginning to understand the impact that longer health span could have on their workforce. For example, as people work later in life, they may need training or retraining to manage shifting workforce demands (see the sidebar, "What will change in the future of work?"). Caregiving support has also become a pri-

"I don't think people will use the word retirement in 20 years. The fundamental narrative of how we think of our lives—school, work, retirement periods—will be gone. We will have new narratives that will allow older people to work."

— *Longevity market digital publisher*

ority for more employers, as they see productivity levels impacted when their workers face personal and family issues. In a recent survey of employers, 84 percent said they agree or strongly agree that caregiving will become an increasingly important issue for their company in the next five years.²⁶ As more employers face these issues, they could shift their focus further down the chain and demand that health care focus on preventing these needs from arising in the first place.

Bridging the gap: Getting to 2040

Changes in the concept of work and retirement will likely require new tools to prepare people—and they should focus on the beginning of their careers as much as the end.

WHAT WILL CHANGE IN THE FUTURE OF WORK?

As discussed in *What is the future of work? Redefining work, workforces, and workplaces*, the nature of work is changing across all industries globally. Emerging technologies such as AI and robotics, generational shifts in the workforce, and an explosion in the contingent workforce are only some of the factors driving changes to the future of work. When considering how these factors may drive change within a particular organization, leadership can consider three separate, but connected dimensions:

- **Work:** With increasing robotics, cognitive, and AI technologies, what work can be done by—and with—machines? How will jobs shift to focus on human value-added skills?
- **Workforce:** With the emergence of nontraditional talent platforms and contracts, who can do the work? How do you leverage the continuum of talent from full-time, to managed services, to freelancers, gig workers, and crowds?
- **Workplace:** With new combinations of collaborative, teaming, and digital reality technologies, how are workplaces and work practices reshaping where and when work is done?





SPOTLIGHT: EARLY MOVERS TO WATCH

Encore.org develops new ideas and models to leverage the skills of adults 50 and older to improve communities and create a social contribution and impact. The goals are to help people train for and seek work and to solve some of society's biggest problems. Among their current projects is one that convenes a network of leaders and organizations committed to turning longer lives into a valuable asset.²⁷ The Purpose Prize, which is now run by AARP, aims to demonstrate that older people can contribute solutions to some of the biggest problems facing society today.²⁸

Startup company **emPower** partners with employers to integrate its mobile-banking solution with the employer's high deductible health plan (HDHP). The company's goal is to simplify the payment and management of health care expenses and ensure that each member has the financial means to fund their out-of-pocket expenses. The solution—which users can access via a smartphone app—gives employees easy access to their HSA account, advances at 0 percent interest rates, and additional features that help with tax optimization and budgeting for future health care expenses.²⁹

FIGURE 3

Attaining this future will likely require action on behalf of today's companies (cont'd)

Action	Examples in action
 <p>Go beyond care: Organizations should focus on developing an understanding about how increasing longevity and a more flexible mindset around work arrangements can impact individuals' financial health and well-being.</p>	<p>As more people work outside of traditional employment settings, fewer could have access to traditional employer benefits (short-term and long-term care insurance, 401(k), pensions). While the need for these arrangements may decrease over time as people stay healthy longer, they will still need a safety net. Health care organizations should pair data and technology to identify those needs and communicate solutions using convenient and preferred engagement channels.</p> <p>Focusing on the intersection of financial health and physical health may also be critical, as these two are inseparable from one another. For example, researchers have found that during the Great Recession, US adults' blood pressure and blood glucose levels increased.³⁰</p>
 <p>Build new business models: As consumer demand to access and own their data increases, business models should be built around giving them tools to tailor options and solutions to their own unique set of needs around benefits.</p>	<p>Health care organizations could access historical clinical and claims data to predict health risks and pair consumers with products that help guide benefit decision-making. emPower, for example, has developed a tool to simplify the high deductible health plan (HDHP) and health savings account (HSA) process (see case studies).</p>
 <p>Forge partnerships: Rethinking relationships with employers to support new concepts for careers and how benefits may need to change may also be critical.</p>	<p>Health care organizations could work with financial services companies to create solutions for consumers (especially those outside of traditional employment situations) that span their entire life and are adaptable as priorities and needs change. For example, through services like patient advocates or wellness navigators, organizations could work with employers to integrate daily medication reminders through the patient's mobile calendar app and in-home smart devices with their work schedules.</p> <p>Life sciences companies could work with employers to understand productivity and absenteeism rates, such as how well consumers perform at work when they are sick vs. when they are at their peak health.</p>
 <p>Change talent models: For organizations in their roles as employers, the future of work could have a significant impact on their operations. As described in <i>The future of work: How can health systems and health plans prepare and transform their workforce?</i>, disruptive trends including exponential technology, flexible labor markets, and generational changes are creating opportunities to evolve work, the workforce, and the workplace.</p>	<p>In the future, employers may shift to focus on training and retraining younger and older workers to bolster the capabilities they bring to the workforce. Strategies should include developing a dynamic strategic workforce plan focused on a three- to five-year time horizon, establishing governance and leadership and bringing critical stakeholders on the journey, and leveraging data and analytics.</p>

Source: Deloitte analysis.

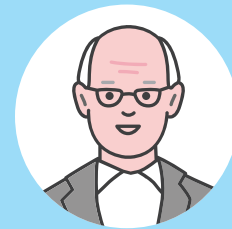
How will the future of health change where and how people live?

PAIRING SMART HOMES of the future with smart health communities, enabled by technology, and a shift toward sharing, renting, or subscribing could lead to an entirely different vision for how and where people age.

It is said that home is where the heart is. In the future, the home could also be where heart health is. Smart homes, enabled by the IoT, may be so in tune with daily routine that they will do the work for people by using equipment such as remote-monitoring biosensors. A home might include a hyperconnected bathroom where the mirror and other tech-enabled appliances process, detect, and analyze health information. Highly attuned sensors embedded in a bathroom mirror, for example, might track body temperature and blood pressure, and detect anomalies by comparing those vitals to a person's historical biometric data.

Enabling technology should not stop when people step out of their homes, however. In the future, communities and services should be set up to support people of all ages and needs. Communities of the future could allow residents to naturally incorporate health and well-being into their everyday lives. Medical and health facilities won't be just in

Ten years later, Larry is 80 and is still engaged with his social club and has built deep friendships with a few of the members through online and in-person meetups. Realizing they are getting older, a few members decide to move in together and share a cleaning and cooking service. To Larry it feels more like a convenient luxury than assisted living. Living with his friends and mentoring keeps his mind fresh and feeling young.



one place—they will be everywhere, as these traditionally brick-and-mortar locations shift to sit on mobile-enabled platforms. Community could go beyond the physical structure to focus on virtual communities to support health and well-being. And as partially and fully autonomous vehicles become increasingly mainstream, many accessibility challenges could be solved—and demand for trauma care could also fall as road traffic accidents decrease.³¹ These community structures and

“If you installed 100 grab bars at \$300 apiece and avoided one fall, you would break even because the average fall costs nearly \$30,000.”

— *Aging in place expert*

support systems will likely be vital for supporting people with lower socioeconomic status, as they may not be able to afford a smart home.

Pairing smart homes with [smart health communities](#) could transform the way older people live. But equally important, that combination could change the way people age earlier in life. Instead of behavior and pattern-monitoring warning caregivers and health professionals that an older person living at home is a fall risk, the technology to support health and well-being could focus on keeping people healthy and strong longer—and never becoming a fall risk in the first place. Outright *prevention* of functional impairment could not only lead to more life satisfaction, but lower costs as well. Medicare enrollees with zero chronic diseases but two or more functional impairments have twice as many costs.³²

Finally, projecting the concept of the sharing economy into the future could allow us to envision even more transformation. The concept has already sparked a shift away from owning and toward sharing, renting, and subscribing. In the future, the more willing individuals are to *detach* from materialistic ownership, the more that might enable them to remain *attached* to society. An easy example to think of is driving: For generations, owning a car has been considered an American rite of passage. But, this has led to the inevitable conversations with older family members around when to “take the keys away.” As the sharing economy grows in popularity, this conversation may no longer be needed. And more importantly, using a rideshare or driverless car could allow impaired drivers to stay socially engaged. The sharing economy is already impacting other industries. In real estate,

SilverNest is creating a marketplace for older adults to share their homes—and gain supplemental income.³³ In caregiving, Help-Full has created a marketplace for exchanging tasks—and for developing friendships.³⁴

Change is emerging: Maintaining choice in aging

Many programs already exist that target what most people—regardless of age or disability—really desire: to stay independent and living in their own home. As one example, the National Association of Home Builders (NAHB) has an entire specialty dedicated to this mission: Certified Aging in Place Specialists (CAPS). The CAPS program helps connect people with experts who can make their homes more accessible with handle bars, walk in tubs, wheelchair ramps, and more.³⁵ Today, many homes lack basic accessibility features. Indeed, as a recent Stria article pointed out, “If I can’t take my wheelchair over the front step out of my home, I can’t make it to my driverless car.”³⁶ Solutions that help solve this gap will be critical to getting greater adoption of smart homes. Another company, Minka, hopes to disrupt housing altogether by creating modular housing that allows older adults to remain independent in small, manageable homes (see case studies).

Startups have also begun to tackle one of the most significant priority areas for an aging society: transportation. The fundamental shift away from owning and toward renting or sharing is quickly spilling into the transportation industry. While many health care companies have begun to pay for consumers to use Lyft and Uber, even beyond

getting to and from health care appointments, driverless technology could create even greater opportunity in the future. One company, Voyage, has focused on expanding access of driverless technologies to older adults, launching all of its driverless technology in two places: The Villages retirement communities in Florida and San Jose.³⁷ While these communities serve as important testing grounds, the real impact may come from solving the rural/urban transportation divide. We are still years away from a driverless car managing the dirt—and often snow-covered—back roads of rural Colorado.

The advanced smart home technologies described above may not seem unrealistic to many, as smart home features have already increased in popularity in recent years. But, the feature that is noticeably lacking today is interconnectivity among these devices. Early adopters of smart home technology have a weatherman (smart thermometer), nutritionist (smart fridge), and personal shopper (smart assistant), but none of these technologies are integrated. Some companies, such as Best Buy and its acquisition, GreatCall, are focused on integrating platforms and services to bring a cohesive solution to individuals in their homes.

Finally, as described in the article [Smart health communities](#), we have seen the emergence of these initiatives that purposefully harness the power of communities, often with the help of data and technology, to help improve the health and well-being of community members while also reducing health costs. These nascent communities are beginning to tackle the global burden of lifestyle-related diseases—through both geographical proximity and virtual settings. In both geographic and virtual settings, technology can be used to collect and analyze vast quantities of data, often in real time, to inform research, predict risk, and keep individuals engaged in their own care through behavioral messaging and nudges.

Bridging the gap: Getting to 2040

The future of health will shift away from brick-and-mortar locations to meet people in their homes and communities. Getting there will likely require many steps.




EARLY MOVERS TO WATCH

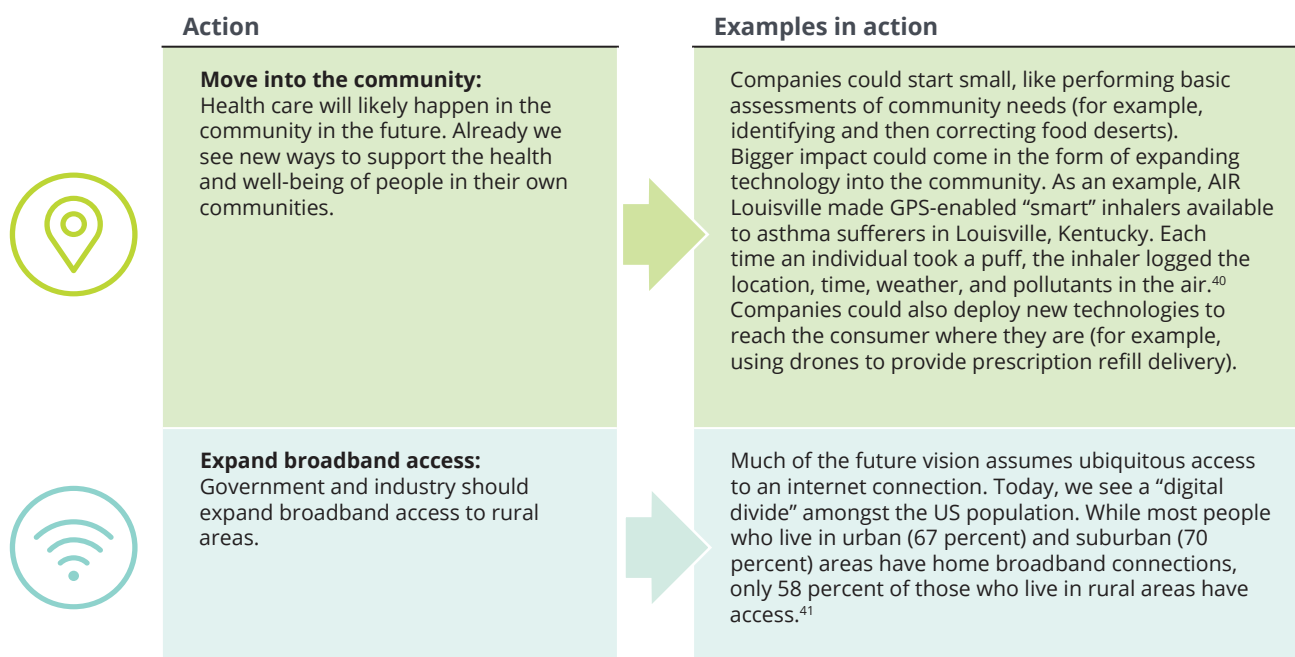
Minka's Multi-Ability Multi-Generation Inclusive Communities (MAGIC) concept is a modular housing model that allows older adults to remain independent in small, manageable homes. A Minka home can be a private residence located in a backyard of another residence, clustered in pocket neighborhoods, or can be a village of modular homes. The founder and his team are working to launch Minka-based developments that blend student, family, and older adult housing. The MAGIC model aims to reduce social isolation and cultivate interaction among generations.³⁸

Best Buy recently acquired GreatCall—a provider of connected health and personal emergency response services to the older adult population. This acquisition helps Best Buy with its new strategy, “Best Buy 2020: Building the New Blue”, in which they have focused on “addressing the growing needs of the aging population with the help of technology products and services.” GreatCall makes mobile phones and wearable devices that connect the user to operators who can connect the user to family caregivers, provide concierge services, or dispatch emergency personnel. They also offer connected health and safety services, including daily medication monitoring.³⁹

FIGURE 4

Attaining this future will likely require action on behalf of today's companies (cont'd)

Action	Examples in action
 <p>Close technology gaps: Smart technology today isn't big picture or interconnected. Smart homes should be flexible and smart enough to manage everyday disruptions such as someone coming to the door. Platforms that enable smart technology to converse and work with each other could enable more transformation.</p>	<p>In the future, this role is likely to be filled by data conveners, organizations that aggregate and store individual, population, institutional, and environmental data (for example, electronic life records), enable interoperability, and ensure privacy and security. Life sciences companies could pair AI technologies with patient device data (such as smart scales), claims, and clinical data to identify patients with unmanaged chronic disease and high likelihood to respond to nudges. Smart scales could be paired with smart fridges to optimize the diet and develop meal plans to keep patients on track with their health plan.</p>
 <p>Go beyond care: Catching homes and communities up with technology advancements will be critical.</p>	<p>Products could give incentives for people to prepare for the future by reimbursing them for modifications meant to make their homes safer and primed for advanced technology. Health care organizations might also serve as localized health hubs that focus on education, prevention, and treatment in a retail setting and managing multistakeholder ecosystems and connections to health homes.</p>
 <p>Forge partnerships: Enable people to be more financially secure by working with partners who understand the financial health of consumers. If you cannot afford your mortgage payment, you cannot live in a smart home. In addition, working with new partners to identify data sources that can help tailor services can be critical.</p>	<p>Health care organizations should develop new partners (such as retailers, local and state governments) to leverage location-based data and eligibility and benefits data to identify lowest-cost sites and communicate recommendations at the right time. Life sciences companies may be able to partner with those same stakeholders to use location-based data to deliver real-time alerts to patients at high risk of contagious illness (such as flu) and steer them to places where they can receive vaccines or other prevention-focused medications.</p>



Source: Deloitte analysis.

How can companies innovate and develop products and services for the future of health and aging?

WE KNOW THAT the future is difficult to predict. The future of health is no exception. We can envision a future in which technology solves every health and well-being issue. But will the proliferation of technology make us desire more human connection or will technology also be able to solve for loneliness in addition to social isolation? We can also envision a future where disease is caught at an early stage or prevented altogether. Will that eliminate the need for a massive caregiver workforce, whether paid or unpaid—or will caregivers be needed to fill different roles? The answers to these questions are unknown—and debated amongst many—today.

How critical is analogue in the digital age?

The vision of the future is one filled with technology to support every need and perform many actions on behalf of consumers. In a world where smart assistants do much of the thinking for you—for example, by scheduling a remote health check-in to be performed while you sleep—will people struggle with a lack of human connection?

Dana is 60 and has limited access to care and limited disposable income. She's frustrated as she sees others aging well with elective devices, sensors, and expensive treatments that keep them active and healthy. She is a little skeptical of these sensors and how the data is used but is open to learning more. During her weekly shopping trip, the sensors in the grocery section of her community health hub notice her mobility has been declining, she spends more time looking for products, and she has been buying more high-calorie, low-nutrient foods, potentially indicating depression. Her cart suggests she stop by the free health kiosk for a checkup, which she ignores. As she exits the store, a clerk who she recognizes asks how she's feeling and mentions that she is eligible for a free delivery service and monthly in-home check-up.



Some of the experts we spoke with asserted that we should maintain analogue relationships in the future as we become more digital. They were focused on the question of how we will combine the profoundly impactful uses of new technology with social and emotional needs. Others we spoke with were all in on digital and believe that technology will solve everything we need as we age, including social connections.

What roles will caregivers play in the future?

In the future we envisioned at the start of this paper, cancer and diabetes are preventable and there is a vaccine for Alzheimer's. This could mean lower levels of functional impairment and fewer people needing support as cognitive or physiological decline takes over. What might that mean for the massive unpaid caregiver population that exists, and the need for whom is growing, today?

Some of the experts believe that caregivers will always be needed—they would just play new roles in the future and would come from different places. Those roles might be in fulfilling emotional, companionship, community needs. Other experts said that there may no longer be such a dire need for unpaid caregivers as consumers may own more of their care.

As companies begin to consider the role they wish to play in the future of health and aging, they should decide how they would answer these questions. What solutions will have the greatest impact on the health and well-being of individuals? One of

Dana's health advocate helps her to identify a friend and neighbor who might be able to help out. The advocate meets with them and provides guidance on what to look out for. To enable Dana to be as independent as possible, she gives Dana a personal virtual assistant device that reminds her when to take medication and checks in on her well-being. Dana's social worker walks her through the privacy settings and encourages Dana's neighbor, who has already adopted the device, to show Dana how to use it. Dana is incentivized to use the device by receiving grocery store discounts for completing wellness check-ins. As Dana's health declines, the virtual assistant patiently walks her through her normal daily routine such as how to make coffee and when to feed her cat. This enables her to live alone for as long as possible and provide just the right amount of support within her budget. One day, Dana wakes up quite late and the virtual assistant hears her feed the cat three times in a row. Her close friend, whom she has granted appropriate permissions, is alerted to check in on her and make sure everything is ok.

the most common issues facing caregivers today is burnout. The demand on those individuals to fill every need of their care recipient can weigh down even the strongest person. Technology, on the other hand, is tireless and thrives in performing repetitive tasks, scheduling, and optimizing logistics. Solutions that pair people's capability to connect with one another with the ability of technology to persist even through the most mundane of tasks may be the most successful ones.

“Our goal is that for every caregiver challenge there is a technology solution.”

— *Innovator*

Conclusion



IN THE FUTURE, services, solutions, products should be designed with, not for, people of all ages to include their needs and preferences. Solutions that work for younger adults should also work for older adults; there will be no “senior”-focused products. Organizations can start by

looking for what consumers are asking for, not what they think consumers need. Moreover, they should focus on helping consumers with proactive planning for their health, work, housing, and social needs, and beyond.

Endnotes

1. Centers for Disease Control and Prevention, "Table 22. Life expectancy at birth, at 65 years of age, and at 75 years of age, by race and sex: United States, selected years 1900–2007," 2010.
2. OECD data, "Life expectancy at birth," accessed May 20, 2019.
3. Social Security Administration, "Research note #3: Details of Ida May Fuller's payroll tax contributions," Agency History, accessed May 20, 2019.
4. Lisa Trei, "Changing focus from 'growing old' to 'living long' matters to Laura Carstensen," Stanford News, January 19, 2005.
5. Tim Peterson, "Healthspan is more important than lifespan, so why don't more people know about it?," Institute for Public Health, May 30, 2017.
6. Tim Newman, "Have humans reached the maximum lifespan?," *Medical News Today*, October 6, 2016.
7. Ashton Applewhite, "Let's end ageism," Ted Talks, April 2017.
8. Richard Fry, "Millennials projected to overtake Baby Boomers as America's largest generation," Pew Research Center, March 1, 2018.
9. *The future of aging* is an independent publication and has not been authorized, sponsored, or otherwise approved by Apple Inc.
10. Susan Scutti, "US suicide rates increased more than 25% since 1999, CDC says," CNN, June 22, 2018.
11. Brett Burstein, Holly Agostino, and Brian Greenfield, "Suicidal attempts and ideation among children and adolescents in US emergency departments, 2007–2015," research letter, JAMA Network, April 18, 2019.
12. Jean M. Twenge, et.al., "Age, period, and cohort trends in mood disorder indicators and suicide related outcomes in a nationally representative dataset, 2005–2017," *Journal of Abnormal Psychology* 128, no. 3 (2009): pp. 185–99.
13. Julianne Holt-Lunstad, Timothy B. Smith, and J. Bradley Layton, "Social relationships and mortality risk: A meta-analytic review," *PLOS Medicine*, July 27, 2010.
14. Jason Daley, "The U.K. now has a 'Minister for Loneliness.' Here's why it matters," Smithsonian.com, January 19, 2018.
15. Age UK and Care Connect, "Loneliness and isolation - understanding the difference and why it matters," accessed May 24, 2019.
16. Element 3 Health, "Healthcare innovator attacks social isolation and loneliness with rapidly expanding network of clubs," February 21, 2019.
17. Neolth, "Personalized stress management," accessed May 20, 2019.
18. Katherine Grill, "How you can use stress management to take control of your health," LinkedIn, March 27, 2019.
19. Kumon, "SAIDO Learning®/Learning for a Healthy Brain Centers," accessed, May 20, 2019.
20. Oxford Economics, *The longevity economy: Generating economic growth and new opportunities for business*, accessed May 20, 2019.
21. Corinne Purtill, "A Stanford researcher says we shouldn't start working full time until age 40," Quartz at Work, June 27, 2018.

22. David Rae, "Will the cost of healthcare devour your retirement income?," *Forbes*, July 9, 2018.
23. Purtil, "A Stanford researcher says we shouldn't start working full time until age 40."
24. Adrienne Bibby, "The best work-from-anywhere jobs for older workers," Flexjobs, August 17, 2017.
25. Kelly Monahan, Jeff Schwartz, and Tiffany Schleeter, *Decoding millennials in the gig economy: Six trends to watch in alternative work*, Deloitte Insights, May 1, 2018.
26. Northeast Business Group on Health (NEBGH) and AARP, *Caregiving and the workplace: Employer benchmarking survey*, July 2017.
27. Encore.org, "About: Our quest," accessed May 20, 2019.
28. Encore.org, "The purpose prize," accessed May 20, 2019.
29. Startup Health HQ, "FinTech health startup creates a smarter way to afford high-deductible health plans," accessed May 24, 2019.
30. Dan Kopf, "How much money do people need to be happy?," Quartz, February 24, 2018.
31. Ralph Judah et al., *New roads to the health care of tomorrow*, Deloitte Insights, February 27, 2018.
32. The Scan Foundation, "Databrief: Medicare spending by functional impairment and chronic conditions," DataBrief series No. 22, October 2011.
33. Silvernest, "Homesharing, simplified and supported," accessed May 20, 2019.
34. Help-full, "Give. Receive. Share.," accessed May 20, 2019.
35. Laurie Orlov, "Introducing Silver Spaces app for senior home assessment," Ageing in Place Technology Watch, February 25, 2015; Silver Spaces, "Homepage," accessed May 20, 2019.
36. Jess Stonefield, "Are incentives the next innovation in aging in place?," Stria, January 7, 2019.
37. Voyage, "Delivering on the promise of self-driving cars," accessed May 20, 2019.
38. Andy Smith, "Bill Thomas believes modular homes are solution to middle market challenge," Senior Living Innovation Forum, March 13, 2019.
39. John Vomhof, "Best Buy acquires GreatCall, expanding reach in health space," Best Buy, August 15, 2018.
40. Air Louisville, "AIR Louisville results summary," accessed May 20, 2019.
41. Pew Research Center, "Internet/broadband fact sheet," February 5, 2018.

Acknowledgments

The authors would like to thank **Leslie Korenda** for her role in conducting the qualitative interviews that informed this research and for writing sections of the paper. The authors would like to thank **Aviva Sufian** for her input throughout the project, helping connect the research team to her network and giving guidance on the direction of the paper throughout the writing phase.

The authors would also like to thank **David Betts, Judy Merzbach, Ben Jonash, Kristen Schultz, Kara Settoon, Nina Marcos, Alexis Concordia, Hanna Patterson, Maura Cassidy, Lauren Wallace, Junko Kaji, Mary Cellini, and Ramani Moses** for their insights and input throughout the project.

About the authors

Leslie Read | lread@deloitte.com

Leslie Read is a principal at Deloitte Consulting LLP and leads the firm's Health Plans Customer Transformation solutions. Her work has focused on helping CMOs, CSOs, CCOs, and other health plan and provider leaders to transform their organizations to be more consumer-centric and drive consumer engagement in health, and to deliver profitable organic growth through strategies and capabilities focused on the emerging health care consumer. Read holds an AB from Princeton University and an MBA from the Tuck School of Business at Dartmouth College. She is based in Boston.

Claire Cruse | cboozercruse@deloitte.com

Claire Cruse, Deloitte Services LP, is a gerontologist and health policy manager with the Deloitte Center for Health Solutions. Her primary research interests are in Medicare, Medicare Advantage, payment reform, postacute care, and the individual health insurance market. Cruse earned BS and BA degrees and a certificate of gerontology from the University of Georgia and holds a master of public health from The George Washington University. She is based in Denver. Connect with her on LinkedIn at <https://www.linkedin.com/in/claireboozercruse>.

Jesse Gaskin | tgaskin@deloitte.com

Jesse Gaskin, Deloitte Consulting LLP, is a manager within Doblin, Deloitte's innovation group. He designs patient-centered offerings, experiences, and organizational innovation capabilities. Gaskin holds a master of design in human-centered design from the Institute of Design, as well as an MBA from the Illinois Institute of Technology. He is based in New York. Connect with him on LinkedIn at <https://www.linkedin.com/in/jthomasgaskin>.

Contact us

Our insights can help you take advantage of change. If you're looking for fresh ideas to address your challenges, we should talk.

Industry leadership

Leslie Read

Principal | Deloitte Consulting LLP
+ 1 617 437 3513 | lread@deloitte.com

Leslie Read is a principal with Deloitte Consulting LLP and a leader in the Customer and Marketing Strategy practice. She is based in Boston.

The Deloitte Center for Health Solutions

Sarah Thomas

Managing director | Deloitte Center for Health Solutions | Deloitte Services LP
+ 1 202 220 2749 | sarthomas@deloitte.com

Sarah Thomas is the managing director of the Deloitte Center for Health Solutions.

Claire Cruse

Health policy manager | Deloitte Center for Health Solutions | Deloitte Services LP
+ 1 303 305 3143 | cboozer@deloitte.com

Claire Cruse, MPH, is a gerontologist and health policy manager with the Deloitte Center for Health Solutions.

Deloitte. Insights

Sign up for Deloitte Insights updates at www.deloitte.com/insights.



Follow @DeloitteInsight

Deloitte Insights contributors

Editorial: Ramani Moses, Blythe Hurley, Rupesh Bhat, and Nairita Gangopadhyay

Creative: Kevin Weier

Promotion: Alexandra Kaweck

Cover artwork: Taylor Callery

About Deloitte Insights

Deloitte Insights publishes original articles, reports and periodicals that provide insights for businesses, the public sector and NGOs. Our goal is to draw upon research and experience from throughout our professional services organization, and that of coauthors in academia and business, to advance the conversation on a broad spectrum of topics of interest to executives and government leaders.

Deloitte Insights is an imprint of Deloitte Development LLC.

About this publication

This publication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or its and their affiliates are, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your finances or your business. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser.

None of Deloitte Touche Tohmatsu Limited, its member firms, or its and their respective affiliates shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee (“DTTL”), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as “Deloitte Global”) does not provide services to clients. In the United States, Deloitte refers to one or more of the US member firms of DTTL, their related entities that operate using the “Deloitte” name in the United States and their respective affiliates. Certain services may not be available to attest clients under the rules and regulations of public accounting. Please see www.deloitte.com/about to learn more about our global network of member firms.