



# Acknowledgments

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Research was conducted for Project Catalyst by HITLAB. HITLAB is a healthcare innovation lab dedicated to improving the quality and accessibility of healthcare worldwide. We help leading organizations ideate, create and evaluate technology-based solutions to pressing healthcare challenges. Our team of public health researchers, anthropologists, statisticians, clinicians, engineers, economists, strategists, and designers is determined to address healthcare needs across the globe. We work with a wide variety of stakeholders in both the public and private sectors to design and disseminate studies, programs and products that improve healthcare access and delivery. For more, visit:

[www.aarp.org/technology/innovations/innovation-50-plus/project-catalyst/](http://www.aarp.org/technology/innovations/innovation-50-plus/project-catalyst/)

[www.hitlab.org](http://www.hitlab.org)



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# Executive Summary

**F**rom October through December 2015, Project Catalyst and HITLAB conducted a nationally representative survey panel, ethnographic observations, and semi-structured interviews to better understand how caregivers are currently using technology, which technology functions they are interested in, and the barriers innovators need to overcome to adequately meet caregivers' needs.

As of late 2014, approximately 40 million Americans provided unpaid care to an adult. This population of caregivers is estimated to reach 45 million by 2020, caring for 117 million people.

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***71% of caregivers are interested in technology, but only 7% are currently using it to assist with their caregiving duties.***

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## **The challenge of being a caregiver is real.**

Most caregivers care for one adult on their own. For half of caregivers, it's a part- or full-time job.

- 91% of caregivers care for one adult; 81% are the primary caregiver and 68% care without any paid assistance.
- 21% of caregivers perform 21-40 hours of care per week, and 30% care for 41 or more hours per week.

## **While caregivers' use of technology to aid their duties is scant, their interest in tech is high:**

- 71% of caregivers are interested in technology to support their caregiving tasks.
- 59% of caregivers say they are likely to use a currently available technology, when asked about their likelihood to use a range of already available technologies.
- 7% of caregivers are already using or have used technology available in the market.
- Technologies for scheduling, organizing, and medication refill and delivery are used most, and those used least are technologies for finding and procuring assisted living or in-home aides, or for viewing and sharing motivational content about caregiving.

Barriers to technology adoption are wide and many, and caregivers perceive lack of awareness, cost, and time to find or learn about new technologies to be their greatest hurdles.

They say things like, “There are so many options. I don’t know which ones are the best, or even which ones are right for me.” Many caregivers also perceive technology won’t be better than traditional methods they are already following. This perception follows lack of awareness, as caregivers are unfamiliar with all the benefits available to them through technology that can improve their caregiving activities.

Technology use will rise with time.

Younger caregivers are already using technology twice as much as their aged counterparts, and among those who aren’t currently using available technologies, younger caregivers more often say they are likely to use technology in giving care.

- 8.5% of caregivers ages 18-49 years are already using technology for caregiving, whereas only 4.6% of caregivers ages 50 and up are using those same technologies.
- 65% of caregivers ages 18-49 years said they are likely to use available technologies, whereas 56% of caregivers ages 50-64 and only 38% of those ages 65 and up said the same.

Technology that offers peace of mind is what caregivers want most.

More than three-quarters say they are interested technology that helps them check on or monitor a loved one. Available technologies are in use by only 10% of caregivers. Caregivers say these technologies, while attractive in principle, are too costly and complex, and therefore not worth the investment of time and money for technology that is only useful in rare and emergency situations.

Caregivers want tools to ensure medications are managed accurately and with ease.

Again, more than three-quarters say they are interested in technologies that can help with medication refills, delivery, and adherence. And similar to monitoring technologies, only 11% currently use refill and delivery tools, and 8% use adherence tools. Caregivers said awareness of the best tools was a significant barrier, as well as the perception that medication management tools lack total interoperability. If a tool helps them obtain and track prescriptions, but doesn’t provide refills for all medications at all available providers, then they’d rather not use the tool at all.

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**Younger caregivers (18-49 years) use technology twice as much as older caregivers (50+).**

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With many participants in the circle of care, caregivers seek integrated, multifaceted platforms that help them coordinate tasks and selectively disseminate information.

20% of caregivers currently use technology for calendars and scheduling, and 13% use it for tracking tasks. They want organizational tools that allow them to communicate with other members of their care team, including informal and professional caregivers. They want tools that engage the care recipient with his or her own profile. And they say they are tired of using many single-point solutions; they want one platform that can be adjusted to their individual (and changing) needs.

When looking to hire help online, caregivers have significant trust issues.

While web-ordered, on-demand services like Uber are growing in popularity generally, only about half of caregivers reported being likely to use service technologies in caregiving. Caregivers are especially wary of relying on online information or interactions alone when hiring anyone to come into their care recipient's home. From basic services like meal delivery to specialized services like a home aide, caregivers seek a high level of assurance before inviting in support of any kind.

Opportunities abound.

Innovations in these areas can unlock countless hours, restore emotional energy, and significantly improve the quality of life for millions of caregivers and their care recipients.

On the near horizon, we see vast opportunity for technology innovators to create solutions that help alleviate the stress and workload of unpaid family caregivers.

To download this report, visit [www.aarp.org/caregivertech](http://www.aarp.org/caregivertech).

## Background

By 2020, the number of Americans who are expected to need assistance of some kind is projected to be 117 million, yet the overall number of unpaid caregivers is only expected to reach 45 million. That makes 1 caregiver for every 2.6 persons needing assistance.

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We Need Technology More Than Ever  
to Bridge the Gap

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**117 million Americans**  
are expected to need assistance by 2020

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Forecast:

**45 million** + **5 million**  
*unpaid caregivers*      *paid caregivers*

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In the year 2020, the size of the caregiving market opportunity will reach an estimated \$72 billion.

**T**he market opportunity includes spending on needs such as health and safety awareness, care coordination, transportation, caregiver quality of life, social well-being, and daily essential activities, which takes the lion's share at \$53.7 billion (74%). Total spending across these areas for the years 2016-2020 is expected to be \$279 billion.<sup>1</sup>

Beyond direct spending, the opportunity costs of family caregiving are huge: \$522 billion annually, as measured by RAND Corporation by estimating income lost during the time that unpaid caregivers spend on eldercare.<sup>2</sup>

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1. Caregiving Innovation Frontiers. AARP. Jan 2016. <http://goo.gl/jaUyhH>

2. "The Opportunity Costs of Informal Elder-Care in the United States: New Estimates from the American Time Use Survey." RAND Corporation. Jan 2014. [http://www.rand.org/pubs/external\\_publications/EP66196.html](http://www.rand.org/pubs/external_publications/EP66196.html)

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**Half of family caregivers in 2014 were under age 50, and a quarter were millennials.**

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For more on Project Catalyst, including [our inaugural project report](http://www.aarp.org/technology/innovations/innovation-50-plus/project-catalyst) on building better sleep and activity trackers, visit <http://www.aarp.org/technology/innovations/innovation-50-plus/project-catalyst>.

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## Context: Why This Study

**T**his large market opportunity is filled with people over 50 who are online and connected, and who would make use of technology that is intuitive and consumer-friendly. There is not enough technology that can meet their needs, especially in health and wellness, presenting large and significant opportunities for a double bottom line: increasing revenue while providing Americans with products that improve their lives as they age.

Moreover, the 50+ population receives care from millions of caregivers under age 50 (half of family caregivers in 2014 were under age 50 and a quarter were millennials), who embrace technology even more than the 50+. We therefore see a strong likelihood of this younger, rising, and tech-friendly generation of caregivers to seek, adopt, and share technologies that support their caregiving responsibilities.

Project Catalyst exists to fill gaps in the market by putting the 50+ consumer at the center of innovation. By conducting consumer research of new and emerging products with the 50+ consumer, we help inform innovators about where opportunities exist, and how their products and services are working to improve the lives of Americans over 50.

In line with our purpose, Project Catalyst partnered with HITLAB to design and carry out a deeper investigation of:

- How caregivers are currently using technology
- What functions caregivers are interested in
- Barriers that innovators need to overcome to adequately meet caregivers' needs

Findings from HITLAB's quantitative and qualitative studies are published in this report.

We invite investors and innovators to use these findings to guide them in developing tools that improve lives and well-being for us all as we age.





# Study Methodology

To gather information about how caregivers use technology, the functions they are interested in, and the barriers product developers will need to overcome, HITLAB designed and conducted a study containing three data collection components:



*Nationally representative panel survey*



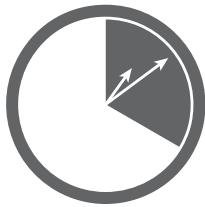
*Ethnographic observations*



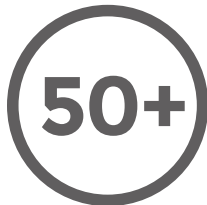
*Semi-structured interviews*

## Survey Panel

A nationally representative sample of 1,028 caregivers completed online surveys from October through December 2015, answering questions about their experiences and needs as caregivers. Participants met the following criteria:



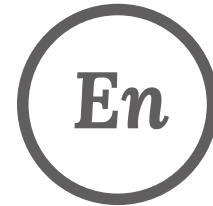
*Provided 8 hours or more of care per week at least once in the past year*



*The individual(s) receiving care were aged 50+ years*



*Live in the United States*



*Could read, speak, and write in English*

Guided by known demographics of the national caregiver population, survey recruitment followed quotas according to gender, income level, education level, race and ethnicity, and age.

## Ethnographic Observations & Semi-Structured Interviews

### **15 survey respondents agreed to do in-home interviews.**

Two HITLAB researchers visited each interviewee at home, asking the caregiver about his or her caregiving experience, access to technology, interest in technology for general use and caregiving, current technology use, and perceived value of existing technology functions for caregiving. Interviewees showed researchers all technologies available in the home, demoed technologies they use, and showed all caregiving-related items such as medications, medical tools, and files. A convenience sample of respondents from the New York Metropolitan area, where HITLAB is located, were selected to participate in this study component.

## Analysis

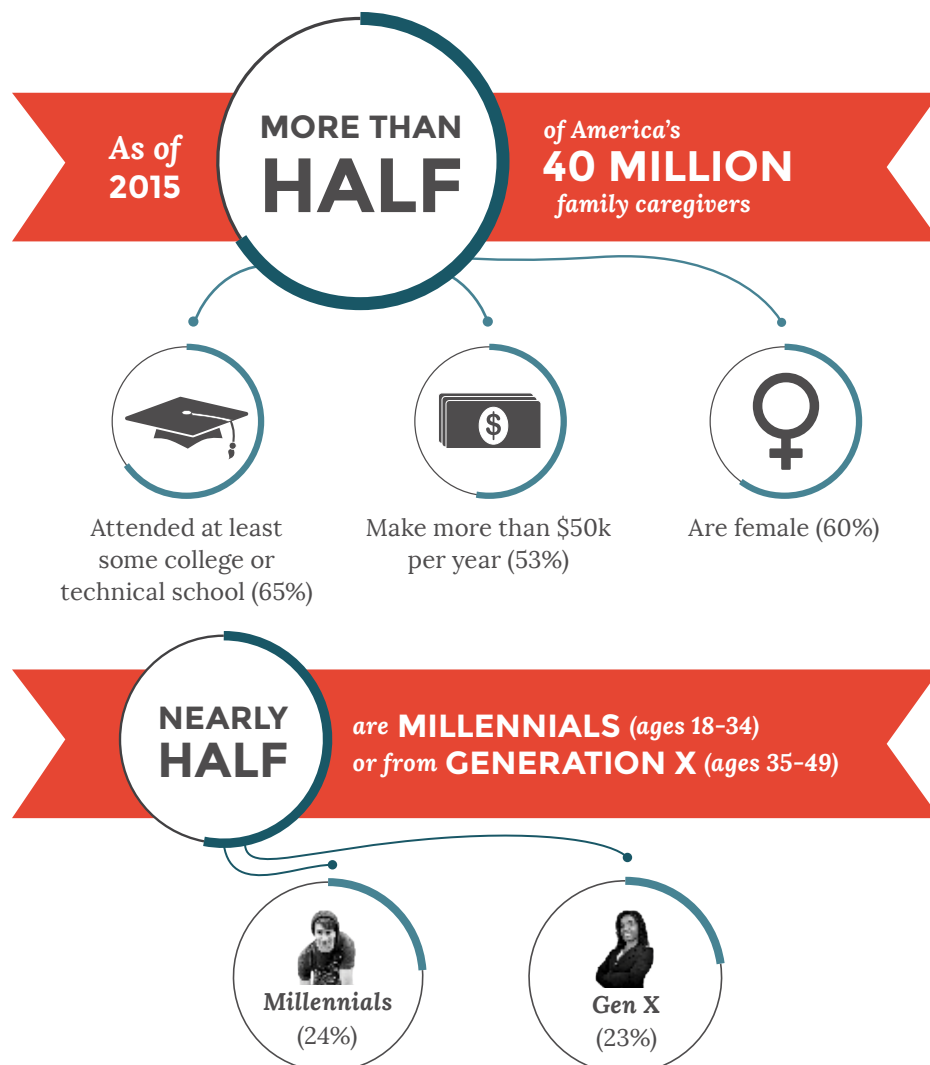
Analysis of qualitative and quantitative data was performed by HITLAB researchers. Descriptive statistics were generated for percentages for categorical variables and measures of central tendency (mean, median, standard deviation, and min/max) for continuous variables, using a confidence interval of 99% and margin of error of 5%. Ethnographic observation and interview data was analyzed using a grounded theory approach (Charmaz, 2006), including techniques of comparison between data from different caregiving contexts to generate hypotheses and both deductive and inductive reasoning.

# Who are America's Caregivers?

Said simply, America's caregivers are all of us.

**S**urprisingly, about half of all family caregivers are 50 years old and older, the age at which many people begin receiving care. Caregivers are found in every demographic and in many ways resemble the average U.S. adult population, albeit with a few exceptions which we've noted below and that are visible in the accompanying charts.

Demographics in the HITLAB study population and previous AARP research suggest a few demographics which are likely to be disproportionately represented among caregivers when compared to the average U.S. population<sup>3</sup>:



3. "Caregiving in the United States." AARP. 2015. <http://www.aarp.org/ppi/info-2015/caregiving-in-the-united-states-2015.html>

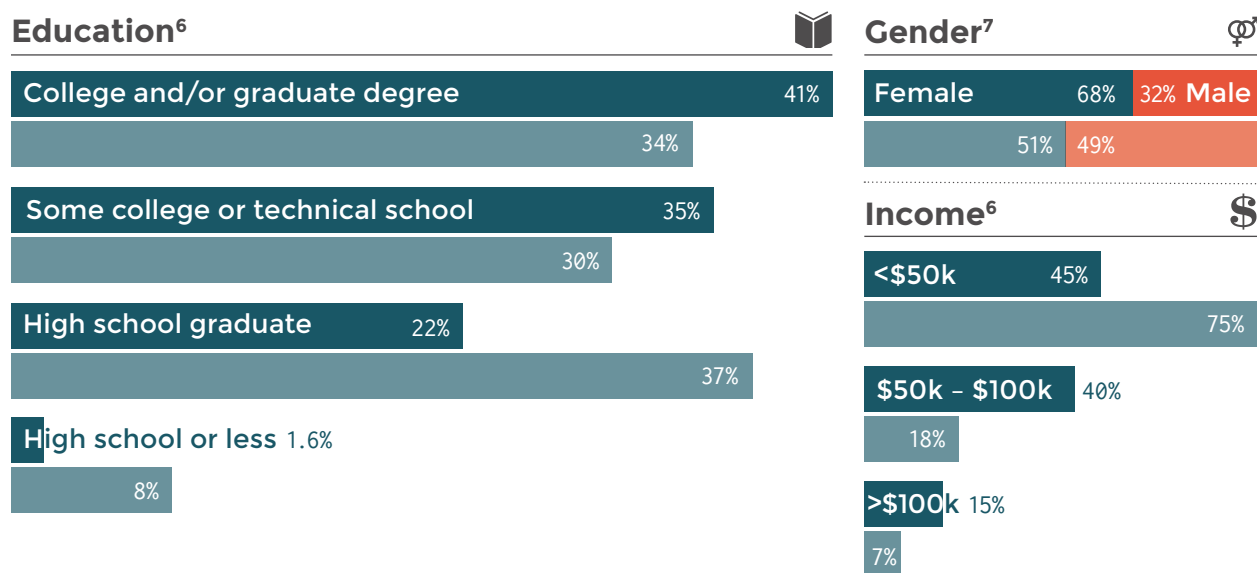
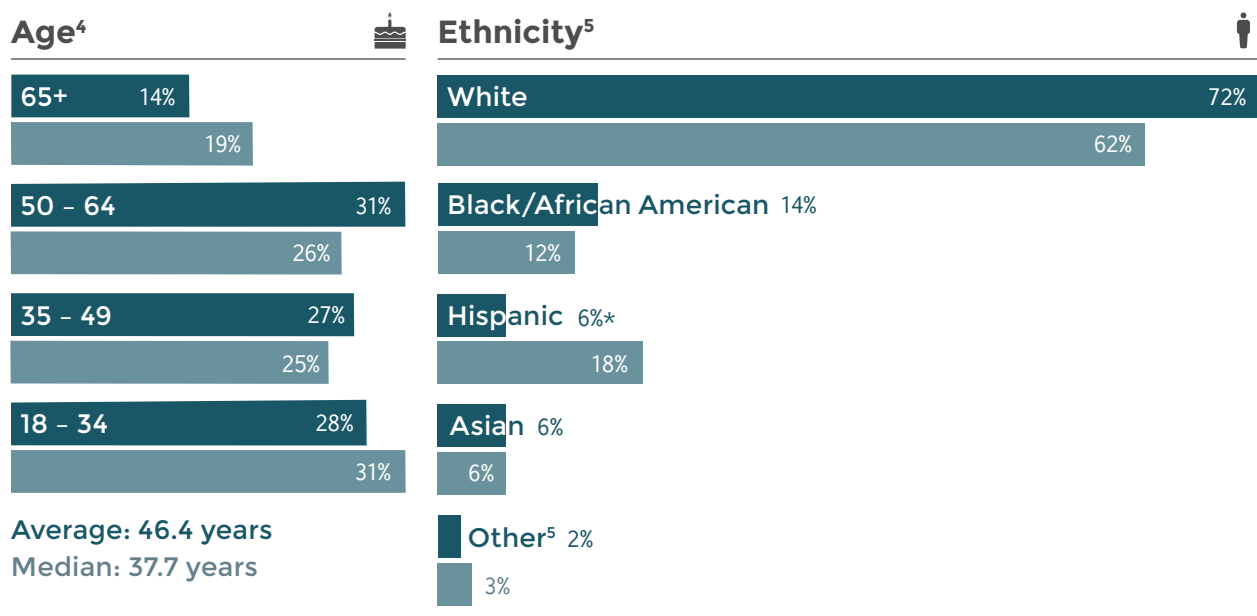
# Caregiver Demographics

Compared to U.S. population

In our study, the demographics of our sample of 1,028 caregivers were recruited to be similar to known national caregiver demographics<sup>3</sup>. The demographic profile of our study population is reported below along with demographics of the general U.S. population, shown for comparison.

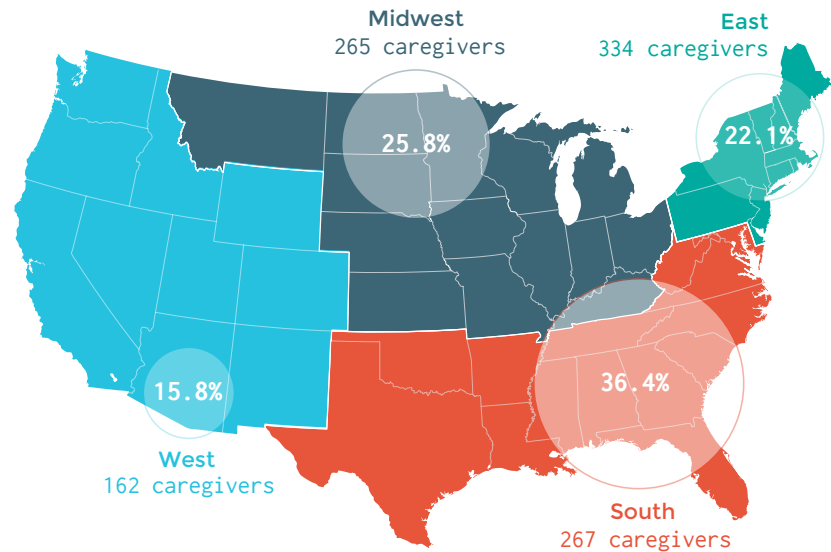
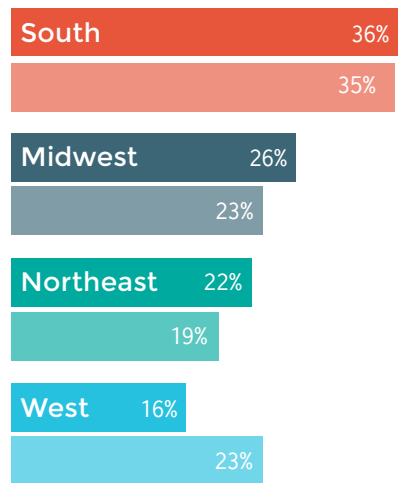
## Key

Study Population
U.S. Adult Population



\* Our study saw a lower than expected<sup>8</sup> response rate from Hispanic caregivers. Unlike previous AARP research used to benchmark caregiver demographics, our study did not offer surveys in the Spanish language, which may have limited the response rate from the Hispanic population. Additional prior research on caregiving shows Hispanic caregivers may also be reluctant to call themselves caregivers due to cultural perceptions of family role and obligations, which may affect the response rate for research requiring respondents to self-identify as caregivers<sup>9</sup>.

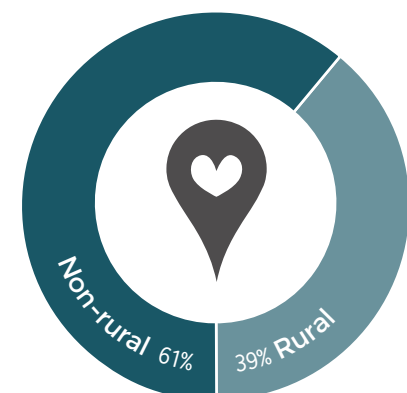
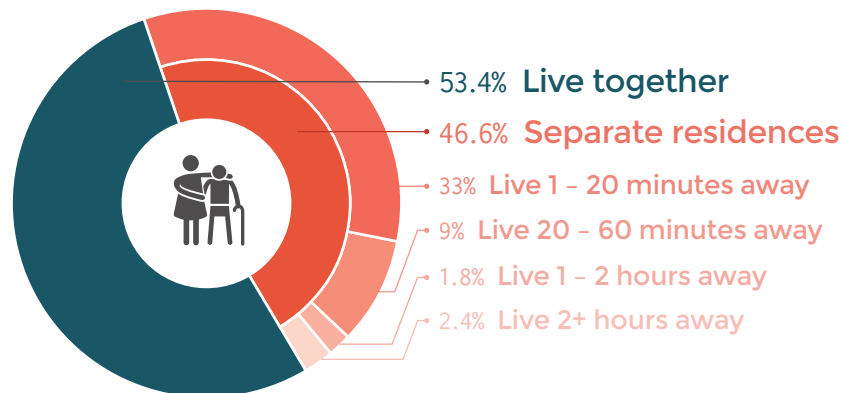
## Geography



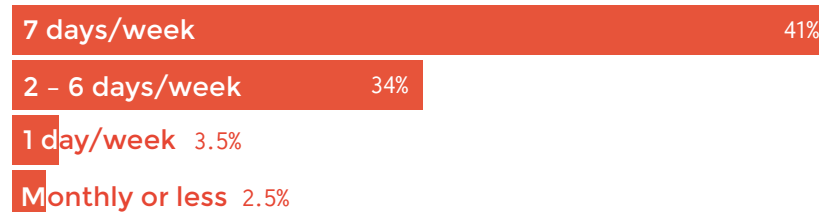
## Proximity to Care Recipient



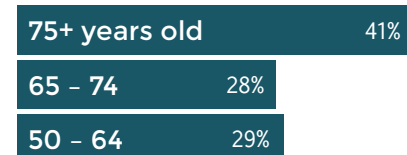
## Care Recipient Location



Of the 46.4% who do not live with their care recipient, they visit:



## Care Recipient Age



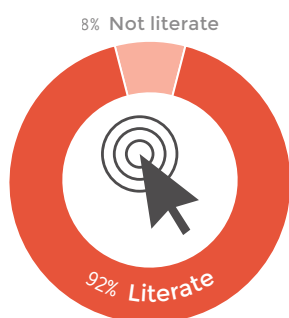
Nationally representative sample including 1,028 caregivers, 71% of whom were currently providing care and 29.4% of whom had provided care in the previous 12 months. Demographic details for the 15 respondents who participated in the ethnographic observation and semi-structured interviews are located in the Appendix.

- Annual Estimates of the Resident Population for Selected Age Groups by Sex for the United States, States, Counties, and Puerto Rico Commonwealth and Municipalities: April 1, 2010 to July 1, 2014. Source: U.S. Census Bureau, Population Division
- "Population Distribution by Race/Ethnicity." The Henry J Kaiser Foundation, 2014. Note: "Other" includes those who selected 2 or more races.
- U.S. Census Bureau in 2013, People 18+ as of March: Sample of 68,000 addresses
- "American Community Survey." US Census Bureau, 2014
- Caregiving in the United States. AARP. 2015. <http://www.aarp.org/ppi/info-2015/caregiving-in-the-united-states-2015.html>
- Family Caregiver Self-Identification: Implications for Healthcare and Social Service Professionals. Dobrof and Ebenstein. Generations (San Francisco, Calif.) Winter(4):33-38 • November 2003

# Caregivers and Technology

Caregivers are technologically literate, comfortable using a variety of devices, and already use technology in their caregiving. As data was collected via an online survey, we expect that technology literacy, comfort, and use to be slightly higher in our study population of internet users than the general caregiver population. However, general internet access rates in caregivers tends to be high: a 2013 study by the Pew Research Center indicates that approximately 86% of caregivers have internet access, compared with 78% of non-caregivers<sup>10</sup>.

## Technological Literacy



Survey respondents completed one or more of the following online activities within 30 days of the survey using a phone, tablet, or computer:

- Meet friends
- Check or update calendar
- Send a photo
- Send a text message
- View a video
- Look for health/medical information
- Play a game
- Shop
- Record fitness activity
- Banking
- Pay a bill
- Set reminders
- Manage a to-do list

The majority of caregivers rate themselves as comfortable with a variety of devices.

Nearly all caregivers (97%) are comfortable with computers. Four out of five are comfortable with tablets (80%) and smartphones (80%), and three in five with other personal-use devices (63%).

## Comfort Across Devices

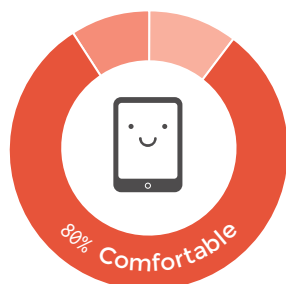
### Computers

1.7% Neutral 1.0% Uncomfortable



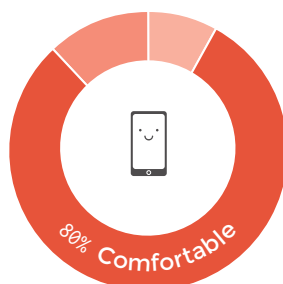
### Tablets

9% Neutral 10% Uncomfortable



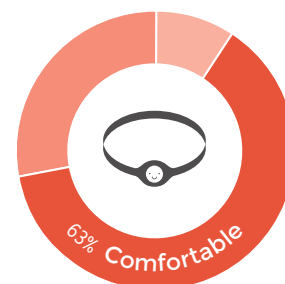
### Smartphones

12% Neutral 8% Uncomfortable



### Other\*

28% Neutral 9% Uncomfortable



\*Includes sensors, monitors, or other personal-use devices (e.g., fall detector, fitness tracker, video monitor)

10. Family Caregivers Are Wired for Health. Pew Research Center. 2013.

## Technology Comfort by Age



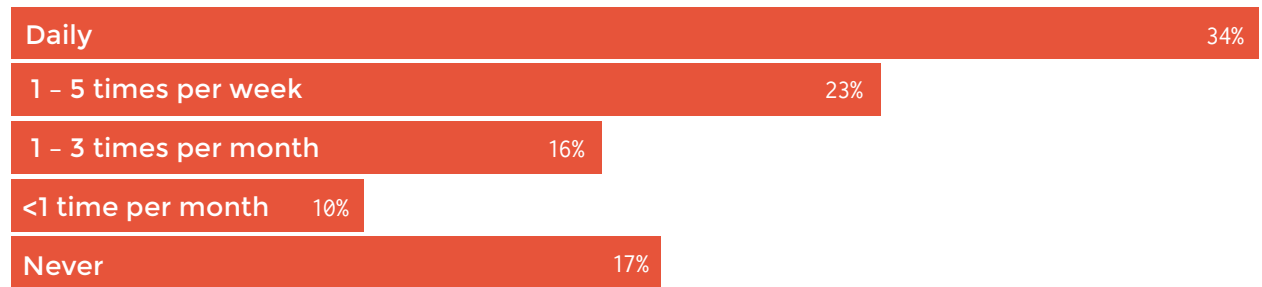
While comfort with computers was high across all groups, the 65+ population reported the lowest levels of technology comfort for smartphones, tablets and devices. Innovators can expect in the short term that mobile and tablet offerings will miss some caregivers, but in the long term and as sensors and other devices become as ubiquitous as mobile phones and tablets, that nearly all caregivers will be as comfortable with any tech device as they currently are with computers.

Computers	Tablets	Smartphones	Devices
18 - 34	97%	95%	85%
35 - 49	98%	89%	76%
50 - 64	97%	74%	48%
65+	96%	49%	28%

## Frequency of Technology Use for Caregiving



A majority (57%) of caregivers already use technology in at least one way to assist with their caregiving duties, once a week or more frequently.



Frequency of use of computer, tablet, smartphone, or device for caregiving in past 12 months.

While many caregivers (43%) currently use technology less than weekly to provide care, a large share of them *want* to use technology, especially when asked about technological solutions for specific activities they perform.

Before looking at their interest in specific technologies, let's take a look at what exactly caregivers are doing when we say broadly that they are "providing care."

# What America's Caregivers Do

**A** significant body of research exists on what caregivers do, and the study behind this report is unique for focusing on the technology-solution component of caregiving. This study also gives rare national-level data, whereas most caregiving studies focus on particular segments of caregivers and recipients such as a demographic, location, or challenge-set that caregivers face.

Research aside, you could think about providing care and imagine anything from a simple few tasks all the way to the commotion of a three-ring circus. Either way, there's cause for stress.

The following quantitative data are national-level data on the spread of duties caregivers perform: from groceries and medication pickups, to help with bathing and dressing, to managing financial affairs and appointments, caregivers perform many jobs. These are categorized as Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). ADLs are the tasks an individual does when they get up in the morning and go to bed, and often involve basic personal care such as bathing, dressing, toileting, brushing teeth, and eating. IADLs are the tasks an individual does once they are put together for the day, including cooking, driving, shopping, managing finances, and managing medication.

Before getting to caregivers' interest in technological support for each type of job they do, let's take a look at what's on their plate.

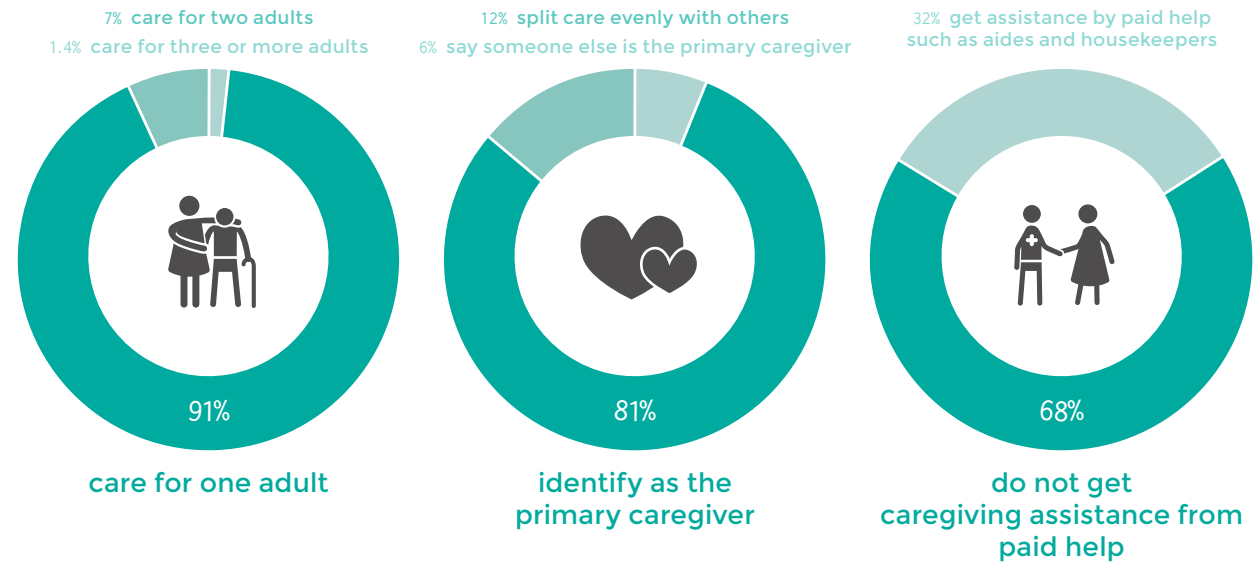
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***This study presents rare national-level data on the spread of duties caregivers perform, as well as their uses and interests in new technology.***

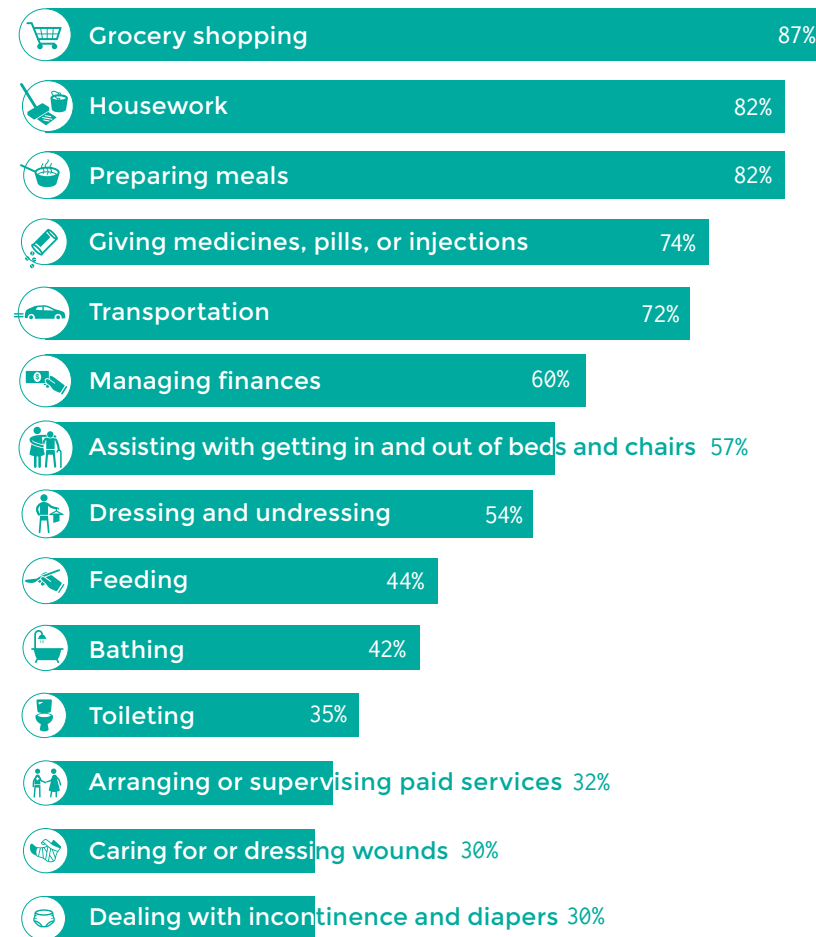
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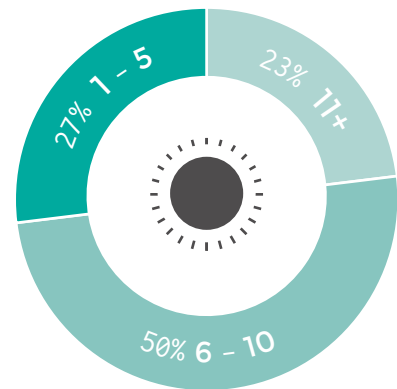
## Most Caregivers Care for One Adult on Their Own...



## Doing a Variety of Tasks...



How many of these activities have you performed in the past 12 months?



50% perform 6 - 10 of these activities

## Which Often Add Up to a Part- or Full-Time Job...



### Hours of Caregiving per Week



## What It's Like, In Their Own Words



“It seems easy from the sidelines because you know, it’s your aunt—you have to take care of her—but it’s really challenging, just emotionally draining.”

—Rick\*, age 29; caring for his aunt, age 54

“It never ends. What is most difficult about the tasks I perform is just living my own life.”

—William, age 38; caring for his mother, age 64

“It’s just challenging. I am taking it one day at a time.”

—Mark; age 67; caring for his wife, age 70

“Parents used to take care of us, but now it’s reversing.... In the beginning it was shocking, but you work with it.”

—Theresa, age 33; caring for her mother, age 73

\* All names that appear in this report have been changed for privacy.

# Areas Of Opportunity For Innovators

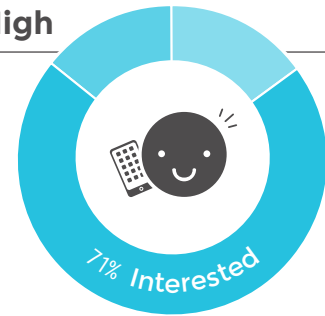
A majority of America's caregivers are interested in using technology to assist their caregiving duties, but current usage of available caregiving technology is low.

Interest in technology is uniformly high, but few caregivers are using the technology that is currently available on the market. This presents a tremendous opportunity to innovate technologies that serve unmet needs and to leapfrog current offerings with better approaches.

## Tech Interest Is High






When asked about interest in using technology to support caregiving activities

15% Neutral  
14% Not interested








## Activities of Daily Living (ADLs)

Routine tasks done with waking up and going to bed to manage one's body. Examples:

-  Bathing
-  Dressing
-  Toileting
-  Brushing teeth
-  Eating

## Instrumental Activities of Daily Living (IADLs)

Varied tasks done during the day to manage one's life. Examples:

-  Cooking
-  Driving
-  Shopping
-  Managing finances
-  Managing medication

In the survey, we asked caregivers to rate their interest in using technology to support a range of ADL and IADL caregiving tasks.<sup>7</sup> An average of 71.5% of caregivers responded that they were interested in using technology across 17 tested ADL and IADL caregiving tasks (range: 62.7 - 79.1%; median: 71.5%).

While interest in technology to support all ADL and IADL tasks was high, caregivers were most interested in using technology to support medication refill and pickup (79.1%), making and supervising medical appointments (77.9%), assessing health needs and conditions (77.5%), ensuring home safety (77.5%) and monitoring medication adherence (77.2%).

7. 'Interest' defined as a ranking of 5, 6, or 7 on a Likert Scale wherein 1=very unlikely, 2=unlikely, 3=somewhat unlikely, 4=neutral, 5=somewhat likely, 6=likely, and 7=very likely

Interest in Technology, by Task	Interested	Neutral	Uninterested
Rx refill + pickup	79%	10%	10%
Making and supervising medical appointments	78%	10%	11%
Assessing health needs and conditions	78%	12%	10%
Ensuring home safety	78%	12%	10%
Monitoring Rx adherence	77%	11%	12%
Checking in on care recipient	76%	12%	12%
Managing stress and emotional challenges (of caregiver)	74%	14%	13%
Grocery and other shopping	72%	13%	15%
Transportation, providing and arranging	71%	15%	14%
Managing finances	70%	16%	14%
Housework	67%	16%	17%
Making medical or care decisions	67%	16%	16%
Providing meals	67%	17%	16%
Budgeting	67%	18%	15%
Arranging or supervising paid services	67%	17%	16%
Giving medicines, pills or injections	65%	18%	17%
Making legal decisions	63%	19%	18%
<b>Total</b>	<b>72%</b>	<b>15%</b>	<b>14%</b>

# Current Use Rates Low, Although Many Say They are 'Likely to Use' Available Technology

Later in the survey, we asked caregivers to rate their likelihood of using a range of technology functions that already exist on the market.<sup>8</sup> Specifically, we asked whether they were likely to use technology for 38 specific functions if each technology were made available to them, removing the barriers of cost.<sup>9</sup>

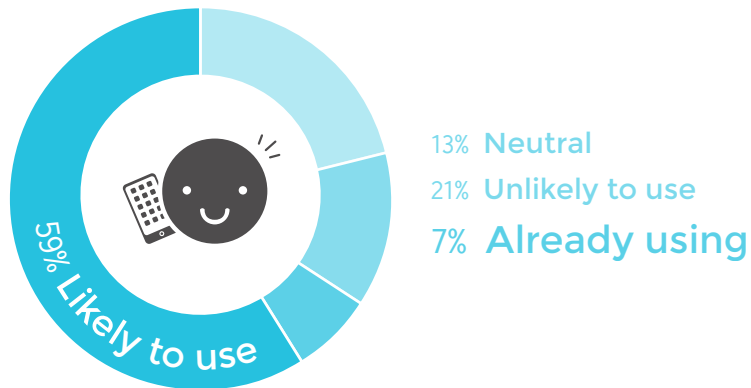
On average, 59% of caregivers were likely to use an available technology function to support their caregiving if the technology was provided to them (range: 47.9 - 72.4%; median: 59%). This figure is particularly interesting when considering the rate of caregivers that reported interest in using technology to support their ADL and IADL caregiving tasks: while 71% of caregivers reported being interested in using technology, 59% of caregivers report being likely to use existing technology, suggesting that technology that is currently available on the marketplace does not adequately meet their needs.

Caregivers reported themselves most likely to use existing technology for alerts for urgent health needs (72.4%), immediate professional care and consultations (70.6%), and personalized resources (70.2%). A majority of caregivers (>50%) reported they were likely to use 35 of the 38 tested technology functions.

The lowest number of caregivers reported being likely to use technology for shopping for assisted living and special care services (47.9%), social networking (49.9%), and shopping for long-term care insurance (50%). It's promising for innovators that even the functions with the least amount of interest still had nearly half of surveyed caregivers reporting themselves being likely to use these technologies.

## Many Caregivers are Likely to Use Available Tech

The majority of caregivers are *Likely to Use* technologies to support caregiving that are currently available on the market.



8. A total of 38 technology functions were selected from a comprehensive analysis of technologies available on the market performed previously by AARP and Parks Associates. "Caregiving Innovation Frontiers."

9. Technology was defined as a computer, internet, mobile application, or device-based tool.

## Available Technologies Already In Use

When we asked caregivers if they were likely to use a technology function, we also presented them with the option of responding whether they already were or previously had.

An average of 6.9% of caregivers have currently or previously used a caregiving technology function (range: 3.2 - 19.5%; median: 6%).

Across the technologies tested, the most caregivers are currently using technologies to create calendars to organize caregiving schedules (19.5%). Second to that, caregivers use technology to create lists or spreadsheets to track their upcoming caregiving activities (12.5%) and to manage Rx refill and delivery (11.3%). The fewest number of caregivers report using technology to shop for assisted living and special services (3.2%), to shop for a home-aid or professional caregiver (4.6%) and to write or read inspirational content related to caregiving (4.7%).

### Technology Already In Use

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#### Top 3



19.5%

Create calendars to organize caregiving schedules



12.4%

Create lists or spreadsheets to track activities

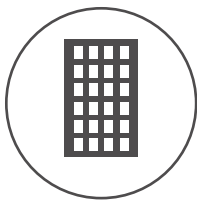


11.3%

Manage Rx refill and delivery

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#### Bottom 3



3.2%

Shop for assisted living and special care services



4.6%

Shop for in-home aide or caregiver



4.7%

Write or read inspirational content

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## Barriers to Using Available Technology

Caregivers offered a number of reasons why they don't use available technology during ethnographic observations and interviews. What they say provides a richer insight to the huge gap between caregivers' interest in technology support and their actual use and likelihood to use available technologies.

1. Lack of awareness was the most frequently cited barrier to adoption.

“Are there any caregiving-specific technologies? I don't know of any.”

—Theresa, age 33; caring for her mother, age 73

2. Cost was also highly reported as a barrier to technology uptake.

“It's expensive mostly. Most of it is a money issue... I can't afford it.”

—Lex, age 20s; caring for her father, age 50s

3. The perception that technology will not produce improvement over current methods gets in the way.

“I call her 24,000 times a day. I don't think I need any monitoring technology.”

—Marge, age 37; caring for her mother, age 65

4. Lack of time to learn or select new technologies were also highly cited barriers.

“I just do not have time to filter through apps, reviews, and information about the apps.”

—Carol, age 43; caring for her father, age 84

# Hopeful Outlook: Tech Use Likely to Rise with Upcoming Generations

In an April 2015 report by the business school at Georgetown University on behalf of Philips, the authors wrote that while 83 percent of caregivers believe “technology is going to make getting older a better or easier experience,” and while those caregivers are “**actively using technology in their own lives,**” (emphasis added), they do not currently use technology “to any meaningful degree in their caregiving responsibilities.”<sup>10</sup>

This corroborates our findings that a majority of caregivers are interested in available technologies and only a minority are actually using them because technologies available now do not adequately match caregivers’ needs, or available technologies present caregivers with insurmountable barriers that prevent meaningful use.

**With use rates what they are today, there’s still room for optimism: tech interest skews towards the rising generation of caregivers.** Innovators can be optimistic about developing technologies that make a meaningful impact on the broad population of America’s caregivers because rates of caregivers already using or likely to use available technology are far higher among millennials and Generation Y than those 50+.

Tomorrow’s generation of caregivers had higher rates of use (medians of 9% for millennials and 8% for Generation Y) than those 50+ (4.6%) of currently available technology. Further, greater portions of millennials and Generation Y said they were ‘Likely to Use’ available technology than those 50+.

## Technology Use by Age

Millennials and Generation Y reported higher rates of ‘Already Using’ and ‘Likely to Use’ technology.

Age	Already using	Likely to use	Neutral	Unlikely to use
18-34	9%	65%	11%	15%
35-49	8%	64%	12%	16%
50-64	4.6%	56%	14%	25.5%
65+	4.6%	48%	13%	35%

It’s clear caregivers are interested in technology, and more so for those under age 50. The following sections include more anecdotal feedback on what caregivers want, also revealing that technologies up to this point have been, for a variety of reasons, insufficient.

10. <http://www.usa.philips.com/b-dam/b2bhc/us/innovation/thought-leadership/aging-well/Family-Matters-in-Caregiving-and-Technology-Adoption.pdf>



# Technology Product Insights

## Caregivers Seek Technology That Can Provide Peace Of Mind

Caregivers are highly interested in technologies that provide peace of mind. They want technologies that give them assurance of their loved one's well-being even when apart, access to their vital signs and access to resources for immediate care and intervention. The core concern at the heart of caregiving is: "Is my loved one safe and well?"

Among the currently available caregiving technologies queried in our survey, the highest percentage of caregivers reported being likely to use technology that alerts them when the person they're caring for requires urgent care (72.4%). Additionally, 77.5% of caregivers reported interest in using technology to ensure home safety and 76.4% of caregivers reported interest in using technology to check in on their loved one.

These responses were echoed in qualitative findings, where emergency monitoring and alerting technologies were commonly mentioned by interviewed caregivers as technologies they need. To a lesser extent, caregivers reported interest in monitoring daily patterns such as movement around the house, opening and closing of doors, bathroom usage, and sleep (59.0% likely to use, 6.8% already using), indicating that routine monitoring is also a need, and a lower priority relative to emergency monitoring and alerting.

“It's getting to the point where maybe cameras would be helpful ... sometimes I have to sleep in her home. Someone has to be here 24/7.”

—Rosie, age 48; caring for her mother, age 82

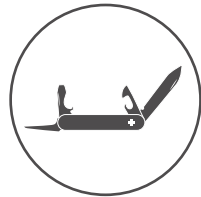
What this amounts to is caregivers want technology that untethers them from being at the immediate side of their loved ones by ensuring access to everything they could observe while being in the same room or within earshot. They often feel the need to have someone with their loved one 24/7, just in case anything happens.

While interest in alerting technologies to support caregiving is high, only 9.7% of caregivers are already using these tools. In ethnographic interviews, caregivers expressed a high level of awareness of emergency

alerting technologies. When asked to name a caregiving technology they had heard of, the most frequently named technology product was an emergency alerting tool. Caregivers most often indicated the following barriers to uptake of available monitoring and alerting technology:

### Barriers to Uptake of Monitoring and Alerting Tools

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Perceived usefulness



Technology complexity



Cost

“I’m usually nearby if something were to happen. I do not know if technology would be that much more helpful.”

–Theresa, age 33; caring for her mother, age 73

“I would need someone to set [the monitor] up, make sure my mom knows how to work it, make sure the home aide knows about it.”

–Marge, age 37; caring for her mother, age 65

“It’s not worth it to pay for an emergency alert because it’s a very hypothetical, rare situation. It would occur only once in a blue moon. I’d find out about [the situation] anyways.”

–Rick, age 29; caring for his aunt, age 54

### Guidance For Innovators

Caregivers really do want the ability to detect emergency events. But they aren’t willing to purchase, setup, or use bulky and expensive technology (especially if it requires upkeep) just to get alerted for a rare event. They want near-invisible or barely-there solutions that they don’t have to think about until they need it.

## Caregivers Want Tools to Ensure Medications are Managed Accurately and With Ease

**T**he importance of managing medications can't be understated. Caregivers know this is a critical aspect of their loved ones' well-being and can't be mismanaged, and it also is a cause of great frustration. The reality seems simple: "Get a prescription. Pick up the drugs. Make sure they get taken. That's it."

Of course there are many interconnected pieces of our health delivery system that require coordination and thus make the reality more complex.

Caregivers were highly interested in using technology to support their medication management activities, with 79.1% of caregivers interested in technology for medication refill and delivery and 77.2% interested in technology for medication consumption monitoring. When asked about their likelihood of using existing technologies for medication management, if made available to them, 65.8% said they are likely to use current technology for refilling and delivering prescriptions and 68.2% are likely to use technology that monitors consumption of medications. While technologies for medication refills and monitoring are widely available on the marketplace, only 11.3% and 7.9% of caregivers are using these tools respectively.

In ethnographic interviews, medication management was the most commonly cited challenge for caregivers:

"The hardest part [of caregiving] is the drugs. She takes an extended version and the pharmacy does not have it all the time. So we have to check what the pharmacist has...then the pharmacist had to check with the doctor and the doctors have to write another Rx and then we get it."

—Mark, age 67; caring for his wife, age 70

"Sometimes I'll pick up prescriptions and the whole process of waiting for it to get filled and having to come back drives me nuts."

—Rick, age 29; caring for his aunt, age 54

Medication management, both for refill-and-delivery and for consumption tracking, is an area that already has many tools on the market. When pressed for why they aren't using the already available tools, the 15 caregivers we interviewed listed a number of barriers. The most commonly reported barrier was lack of awareness, while others repeated these similar refrains: cost, fragmented solutions that don't solve all of their medication management needs at once, lack of interoperability with pharmacies, insurers or other caregiving tools, and time constraints to finding and setting up technology solutions.

“I don't know if our pharmacy has an app. It would be good for them to let us know. A lot things, I think, we are just not aware of.”

—Lex, age 20s; caring for her father, age 50s

### Barriers to Uptake of Rx Management Tools



Awareness



Cost



Fragmented  
Solutions



Interoperability



Time

Because a caregiver can manually manage what's needed with medication management, and because the stakes are high, we posit that they would rather “do it themselves and do it right,” than deal with another technology that may add a little convenience but also comes with hurdles or only partial solutions.

The long-term picture here is hopeful, however. As many of these technologies are well within their first decade or even first few years of existence, it's promising to hear that among the caregivers who reported using refill-and-delivery technologies, 75% of them find the solutions very helpful. The challenge now is to make those elements work for more people and with fewer barriers.

## Organizing All Aspects of the Care Continuum Has Caregivers Seeking Structure and Credible Information

Primary caregivers become de facto Chiefs of Staff for their loved ones, managing appointments with multiple health specialists, securing paperwork required to receive necessary resources, and delegating and supervising work done by paid and unpaid help. Even once a caregiver has answered the core question, “Is my loved one safe and well?” the question they face immediately after necessities are met is: “Am I doing all I can do, and am I making the right choices?”

## Caregivers Are Already Using Tools to Stay Organized, But Better Integration Is Needed

With all the activity on their plate, it’s no wonder that caregivers are interested in technologies designed to help them organize tasks, resources, and people.

Across all available technology functions tested, caregivers reported using organization tools the most. 19.5% of caregivers currently use technology to create caregiving calendars, and 12.5% of caregivers currently use technology for list-making. Fewer caregivers reported current use of sharing organizational tools with other caregivers to coordinate care, with 10.2% reporting using technology to share calendars and 9.4% to share lists. In ethnographic interviews, caregivers often said remembering and scheduling medical appointments is a challenge, and they expressed an interest in technology tools that provided an organizational solution.

“I forgot that my grandmother had a psychiatrist appointment. If the doctor’s office didn’t call to remind me, I would have forgotten. I need something more efficient [to help me keep track of appointments].”

—Shelly, age 38; caring for her grandmother, age 72

“Right now I have to email each doctor separately to make appointments or get [information I need].”

—Amy, age 51; caring for her mother, age 88

The desire for integrating caregiving needs makes sense: caregivers often must coordinate care with many specialists and other members of their care network, while simultaneously tracking things like medication refill dates, grocery lists, and insurance claims. If every specialist and caregiving need has its own app or discrete technology, managing the technologies could become as burdensome for the caregiver as coordinating the primary need. However, we caution against one-size-fits-all approaches. Every situation is different, and a static tool may overwhelm new users when they feel they can't fit their situation into the tool. Similarly, they will get frustrated when they realize there's a lack of adaptability in the platform for accommodating their circumstances and the needs of their loved one.

A challenge for innovators then is to develop organizing tools that are comprehensive and integrated, while simultaneously being adaptable. Caregivers want organizing tools that work for their specific situations.

### **Top reported needs to improve caregiver organizational tools**

1. Seamless communication with other family members to coordinate caregiving tasks
2. Scheduling prompts and appointment reminders to guide the caregiver through appropriate care routines and keep appointments top-of-mind
3. Integration of tools; caregivers want flexibility in tools that allows them to organize a variety of caregiving tasks

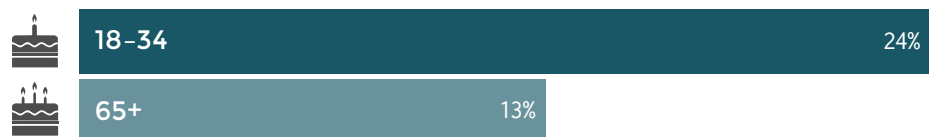
## Interest in Organizing Technologies is Higher Among Younger Caregivers and More Active Caregivers

Age and hours of care per week were strongly correlated to caregivers' likelihood to use organizational tools.

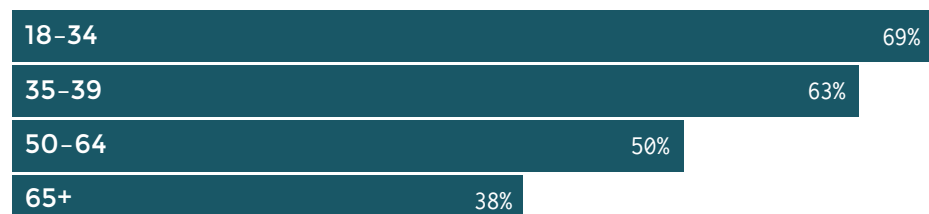
### Already Using Calendar Tracking



24% of caregivers aged 18-34 are **already using** calendar tools, as compared to 13% aged 65+.



Younger caregivers are more **likely to use** calendar sharing tools.



15% of caregivers who provide 41+ hours of care per week are **already using** calendar tools, as compared to 6% who provide less than 10 hours of care per week.

## Caregivers Want Personalized Care Information from Trusted Sources

Two more functions most caregivers say they are likely to use are personalized information on the resources needed to provide care (70.2% Likely to Use, 6.4% Already Using) and reminders with personalized guidance specific to the health condition of their loved one (67.2% Likely to Use, 6.9% Already Using).

And further, caregivers say they are likely to use short-term procedural technologies, such as personalized checklists for what to do after being discharged (generally, 65.1%; and personalized to the recipient's needs, 66.2%).

In ethnographic interviews, caregivers frequently said they want trustworthy, personalized information on how to better provide care to their loved one.

“They should give us better information after leaving the hospital! When the surgery was done, they gave us the same basic information, but no information on if she needed specific help.”

–Marge, age 37; caring for her mother, age 65

“I thought about taking a nutrition class for people with chronic illnesses so I could learn what types of exercise she can do, what food she should eat, and what foods would help her.”

–William, age 38; caring for his mother, age 64

You can hear an overwhelmed caregiver: “Please, just remind me exactly what I need to do and when I need to do it.” As non-experts, caregivers report interest for these kinds of clear, automated prompts that can be a lifeline for knowing what to do. Also, following structures from a trusted source can give caregivers assurance that they are doing both “enough” and “the right things” to take proper care of their loved ones.

## Guidance For Innovators

Provide caregivers with clear structures to follow that are A) matched or selected specifically for the care recipient's condition and B) authored or approved by a trusted source. For further success, build active reminders and prompts in technologies so that caregivers can be assured that if they forget, their technology won't.



# For Hiring Help Online, Winning Trust Is the Major Factor

In general, fewer caregivers reported being likely to use technology for tasks of essential daily living (e.g. purchasing or delivering groceries, arranging in-home aide service, or arranging transportation) as compared to other technologies in the survey.

While essential daily activities are among the most-performed caregiving tasks and thus can be among the first innovators think to provide solutions for, there are important barriers here. These may be the seemingly simpler tasks of caregiving, but innovators must overcome the barriers before expecting widespread and wholehearted use.

<b>Technology Functions for Services</b>	<b>Already Use</b>	<b>Likely to Use</b>	<b>Neutral</b>	<b>Unlikely to Use</b>
Arrange handyman or home repair services in care recipient’s home	6%	<b>55%</b>	12%	27%
Select and pay for services of professional in-home caregiver or home aide	5%	<b>54%</b>	17%	25%
Arrange meal delivery to care recipient	5%	<b>53%</b>	14%	28%
Arrange cab rides or other modes of transportation for care recipient	6%	<b>52%</b>	12%	31%
Arrange grocery delivery to care recipient	6%	<b>52%</b>	13%	30%

Caregivers’ most cited reason for resisting technology in this area is an aversion (their own and the care recipients’) to receiving help inside of the home from people they don’t know.

“I am protective and want to make sure whoever I hire is someone reliable, and would not take advantage of my parents ... I want people coming in who I know, who are not going to hit and run, who will stand by their work, who will be safe. I don’t want a bad experience. I would fly over there to make sure there is not a bad experience.”  
 –Carol, age 43; caring for her father, age 84

Despite caregivers performing these basic daily tasks on a regular basis and the existence of many technologies to address them, distrust for in-home services is high, ranking these functions among the lowest likelihood to use for all technologies described in the survey.

“My mother doesn’t trust them ... she is not OK with having other caregivers entering the house.”

—Shelly, age 38; caring for her grandmother, age 72

In addition to the barrier of trust, caregivers may perceive these tasks as well within their individual abilities, and so the tasks represent something they can do completely and succeed at with little risk. In a realm where much of the needed care comes at the hands of trained professionals and medical experts, doing something that feels within the realm of their control might be a needed experience of personal reassurance and capability.

“See, with stuff like that, that’s when I’m old fashioned. You would want to first see the person online first but I don’t want to just Skype - I think it’s so shady [to hire someone you just met online]. I’d rather just go in person and have an interview with the professional caregiver.”

—Rosie, age 48; caring for her mother, age 82

## Guidance For Innovators

To succeed in this area, innovators will need their technologies to communicate a high level of credibility in the platform and the available service providers, as well as build an adequate screening process into the user experience. Additionally, as this group represents functions that are typically within the abilities and control of a caregiver, the added convenience must significantly outweigh both the real and perceived costs of giving up control and introducing additional variability to the overall picture of giving care.

## While Critical, Caregivers Are Less Interested in Tech for High-Cost, High-Commitment Decisions

Fewer caregivers report being likely to use or already using technologies for decisions that come with high commitments in time and finances, such as long-term-care insurance and assisted-living facilities, than other function sets.

No strong trends were revealed in the qualitative or quantitative data, but we suspect challenges for innovators here are that these decisions occur as “important, but not urgent” for caregivers and consequently get put off. On the other side of the same coin of avoidance is the possibility of caregivers not wanting to think about end-of-life realities. Making material plans for the death of a loved one is not an easy or comfortable place for anyone.

Another possible explanation is that because end-of-life and long-term-care decisions tend to be complex and come with large financial commitments, caregivers are likely to consult a multitude of resources in their decision-making process, extending beyond the bounds of any single app.

### **Guidance For Innovators**

As these decisions are complex and come with large and binding material commitments, innovators may do well to consider their role as aggregators of information that improves the discovery and research process for caregivers rather than as providers or brokers of such services. Additionally and perhaps more significantly, technologies here will need to be attuned to the emotional and psychological delicacies of such sensitive topics.

## Varied Interests in Social Support Resources Point Away From One-Size-Fits-All Solutions

Helping caregivers manage their personal quality of life is a challenge. They are more likely to focus on the needs of those to whom they give care than their own, even at the expense of their own well-being.

Caregivers reported their likelihood to use social support technology at rates close to the median of all technology functions in our survey (59%). A majority of caregivers reported being likely to use technology for four of the five social functions.

From the wide array of opinions voiced during ethnographic interviews, we suspect greater variability in this area than is suggested by the quantitative data. Some caregivers said they deeply desire social support and already benefit from it immensely, while others said it hasn't been useful and they aren't interested in anything further.

<b>Technology Functions for Social Support</b>	Already Use	Likely to Use	Neutral	Unlikely to Use
Connect socially with other caregivers to share and learn from personal experiences	5%	63%	14%	18%
Contribute to or view inspirational stories about providing care to a loved one	5%	52%	15%	31%
Gain emotional or mental health support from professionals to help you manage the challenges of providing care to a loved one	5%	59%	14%	22%
Social media or social networking related to caregiving	8%	62%	13%	19%
Information and resources on how to access services for emotional, mental health, or social support to help you manage the challenges of providing care to a loved one	5%	52%	15%	31%

As is often the case in social settings, some participants lurk and never engage, some respond and never initiate, and some, typically a minority, initiate and respond.

Some have no interest, some want a space to vent frustrations, and others seek more substantial relationships with ongoing exchanges of tips, resources, and referrals.

Because there is variation in the modes of delivery and types of support offered and in caregivers' interest, it is clear social support technology will be strongly appealing to some caregivers and that the best solutions won't be one-size-fits-all approaches, but rather will allow caregivers to participate in a variety of ways.

“I’m not interested in learning about caregivers’ experiences online. I’m not comfortable sharing on social media.”

–Rick, age 29; caring for his aunt, age 54

“I’ve gone on chatrooms to talk with other caregivers. It gets your frustrations out. I just Google something that is peeving me off and I find a chat room.”

–Rosie, age 48; caring for her mother, age 82

“My ideal resource would be something made for other caregivers living locally, and I’d be able to talk to them ... something interactive, where we could message each other or invite each other to chat and refer each other to places.”

–William, age 38; caring for his mother, age 64

## Guidance For Innovators

To succeed with technologies that enable caregivers to manage their personal quality of life or seek and receive social, emotional, and mental support from others, whether peers or professionals, innovators will need their technologies to create environments where caregivers feel safe and validated in their caregiving experiences. Even entering or viewing these resources will likely first require persuading caregivers that taking care of themselves is not only acceptable, but is a critical component of the overall well-being of their care recipient.

# Technology Feature Insights

**D**uring our interviews, caregivers revealed a number of desires and preferences that are global in nature and not tied to a particular caregiving function. We present those findings here.

## Twin Profiles

Caregivers report that it's important to preserve the independence of their care recipients as much as possible throughout the aging process.

“Calendars and spreadsheets are good, but requires everyone to be on the same page, and I think it excludes the actual person who receives the care.”

—Rick, age 29; caring for his aunt, age 54

One indicator of this principle is an expressed desire for any profile-oriented technology to have “twin” profiles, one for the care recipient and one for the caregiver. Such a setup allows care recipients to participate or perhaps lead, preserving their independence, granting some autonomy, and in the very least keeping them involved.

“We log into a lot of accounts: her stocks, her Vanguard medical for her doctors. If we could just log in automatically that would be good. It's hard because I separate accounts for myself and her on multiple sites.”

—Rosie, age 48; caring for her mother, age 82

“Fifty-fifty access would be best. It might give her autonomy.”

—Johanna, age 25; caring for her grandmother, age 65

In our interviews, caregivers expressed interest in twin profiles for technology handling the following functions, among others:

- Medication reminders
- Appointment reminders
- Rx refills
- Doctor appointment scheduling
- Financial, medical and legal information
- Calendars
- Monitoring and alerting systems

## Multiple Needs in a Single Platform

Findings from qualitative interviews indicate that using technology could be prohibitive if caregivers are offered a separate technology solution for each individual caregiving activity or recipient need.

While following an MVP model is smart for innovators in many industries, successful uptake of innovations for caregivers will likely call for something more than an app that does one thing well.

In fact, some caregivers say the wide array of existing apps for various uses is a barrier itself.

“I just do not have time to filter through apps, reviews, and information about the apps. I can’t look through a million apps. I’m too exhausted and there are too many monitoring systems out there. Why can’t we just have one?”

—Carol, age 43; caring for her father, age 84

Besides the convenience of relying on fewer platforms, caregivers are preemptively sensitive to the idea of paying for multiple services as opposed to one that handles them all.

“There are just so many apps. But if it was something that would combine all the functions I need for caregiving, I would be able to afford it rather than paying for many things separately.”

—Sue, age 40s; caring for her father, age 65

These findings also suggest the need for a trusted, authoritative, and curated source that caregivers can use to identify apps or other digital tools that are recommended for their caregiving activities. This will mediate the challenges caregivers face when selecting which caregiving products to use in a saturated and rapidly-changing marketplace.

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**Caregivers would rather pay for one tool that does a lot than pay separately for many tools.**

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# Establish Trust + Expertise

Caregiving is uncharted territory for most caregivers.

They didn't go to school for it. They haven't received formal training. There are no standards of care to which they can look or aspire to know that they are doing a good job. In a few cases, they may have seen their parents provide care to grandparents, but otherwise they have no models to follow.

On top of that, the needs of their care recipient are many and come with high stakes of health outcomes, most of which go above and beyond their level of knowledge and skill.

For these reasons, having the feeling that a resource or a provider is an expert and can be trusted are paramount.

Where individuals might embrace risk in a decision for themselves, they are more risk averse in the same decision in caregiving because the recipient is a loved one to whom they feel responsible for making the right choice.

These factors may explain the prevalence of access to experts and reviews from the experienced.

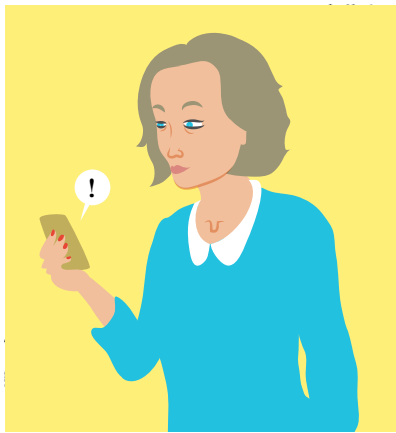
The majority of technology functions that caregivers were most 'Likely to Use' relate to access to professionals, personalized guidance from trusted sources, or access to ratings and reviews of providers.

Rank	Function	Likely to Use
2	Get immediate professional healthcare information or second opinions at any hour or day	71%
3	Receive personalized information on the resources you need to provide care to your loved one	70%
5	Personalized reminders or guidance about care based on your loved one's health condition	67%
6	View directories with professional reviews of caregiving services (e.g. ratings from state inspection reports, seals of approvals, etc.)	67%
7	Personalized advice that considers your loved one's condition to produce a personalized plan to prepare for their discharge from a health facility	66%
9	Read other caregivers' ratings and reviews for various caregiving services, facilities and companies	65%
10	Checklists and information to help you prepare for your loved one's discharge from the hospital or care facility	65%



# A Day in the Life of a Caregiver

6:30 AM

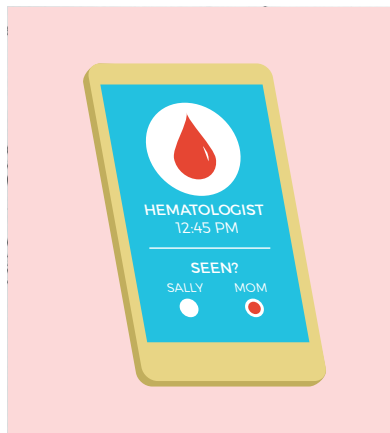


Thursday, June 27, 2019. Sally, 46 years old, wakes up at 6:30 am.

On her way to the bathroom, she checks her phone and sees her mother, age 82, has been awake since 5:30 am after a normal night of sleep.

Sally's phone also shows mom already took her morning meds.

6:45 AM



While brushing her teeth, Sally gets an alert from her mother's professional care coordinator: "Reminder: Mom to see hematologist today. Bloodwork likely. Eat and hydrate normally." The alert includes the time and address.

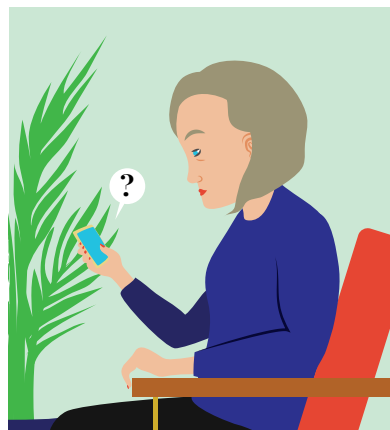
By the time Sally's rinsed her mouth, her mother's seen the alert and clicked to confirm.

11:00 AM



11:00am. Sally gets an alert: "See you at 12:45!" She finishes work and leaves her office to pick up mom.

1:00 PM



While her mother is with the hematologist, Sally sees her mother's vitals updated. She closes the update and scrolls through the app, past this week's blogs. "I'm feeling fine and on top of things this week," she thinks. "I wonder if someone has a question I could help with?" So she opens the caregiver Q&A panel to find someone to help.

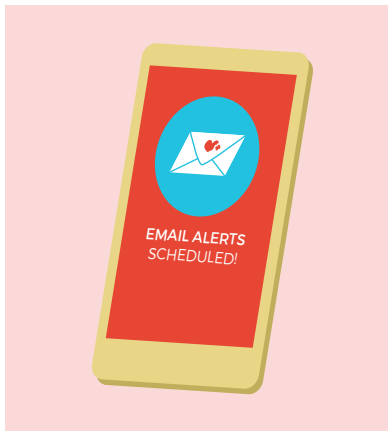
1:27 PM



Mom and hematologist come out.  
"I've got a new medication for her to take for 2 months. I've already sent it to your pharmacy, it should be ready soon."

Alert: "New order for mom ready. Also, we see she's is due for a normal refill in 3 days. We'll have that ready for you today."

2:00 PM

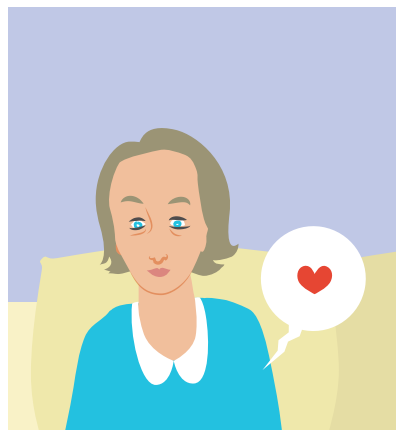


At the pharmacy, Sally walks in, signs, and walks out.

Before reaching the car: "Rx pick-up complete. New recommendations on timing and diet considerations, written by a board-certified pharmacist and nutritionist, have been added to your care recipient's profile. Would you like to receive reminders for the next 5 days?"

Sally taps, "Yes," opens the recommendations, and clicks to have an email sent to all caregivers for mom notifying them of the changes.

10:00 PM



10 PM: On her way to bed, new message from her sister: "Saw you took mom into hematologist today and picked up new meds. Thanks for the info - we'll be sure she takes on schedule while she's with us during July 4th. And too bad the recommendation is less red meat! I'm sure she'll sneak a steak anyway. Thanks for loving mom. I love you too."

# Our Call for Innovation

In broad strokes, the caregiving market shows relatively high rates of interest and likeliness to use technologies, but consistently low rates of technology use across many caregiving functions.

Giving care is challenging, and caregivers are rightly concerned that services for their loved ones are quality and dependable. Given these realities, and caregivers' prevailing interest in technological solutions, especially among younger caregivers, it is our position that caregiving innovations are far from saturating caregivers' needs and in most cases have yet to adequately meet them. Exciting opportunities exist in this massive market.

We call upon savvy innovators, investors and product developers to dive into these findings, conduct follow-up research, and aggressively pursue promising opportunities to meet the needs of America's 40 million family caregivers and the millions of people they serve.

To download this report, visit [www.aarp.org/caregivertech](http://www.aarp.org/caregivertech).

# The Project Catalyst Vision

## Driving Innovation Through Experimentation

Project Catalyst fills a gap in the market by putting the 50+ consumer at the center of innovation. By conducting consumer research of new and emerging products with the 50+ consumer, we help inform developers about how their products and services are working to improve the lives of Americans as they age.

## Why Is Project Catalyst Needed?

The 50+ consumer is missing from the earliest point in the design process. As a result, needs go unmet. Project Catalyst | The Power of We inserts the 50+ consumer at the front end of the process so that new products and services more effectively address their needs, resulting in greater relevance and adoption. And for products already in the market, Project Catalyst contributes to their continuous improvement and ability to improve the lives of Americans as they age.

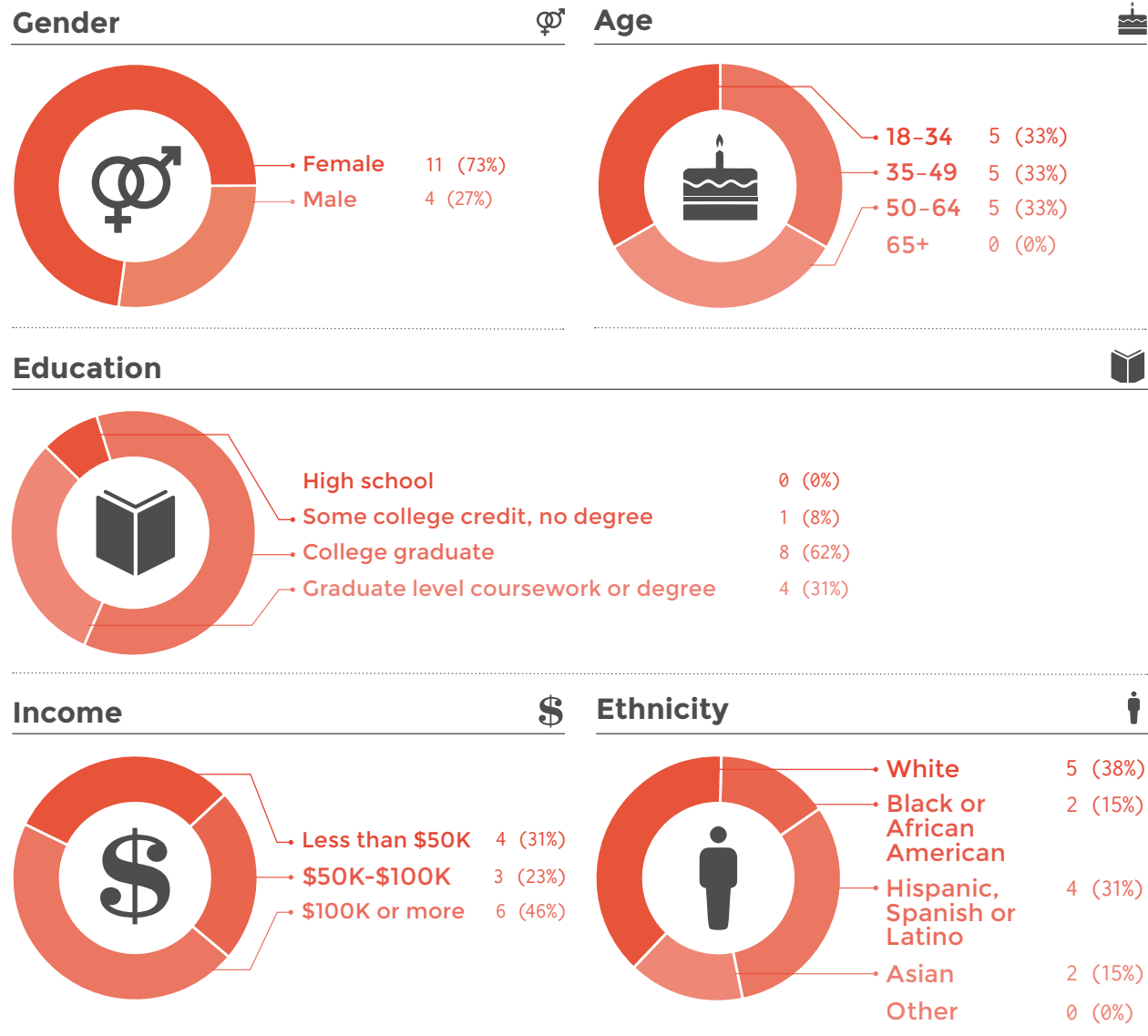
## Good Innovation Will Be Embraced

People over 50 are online and connected, and make use of technology that is intuitive and consumer-friendly. But there is not enough technology that can meet their needs, especially in the health and wellness and the digital health spaces. This is a huge opportunity for the double bottom line. Developers can both provide products that improve the lives of Americans as they age while also increasing revenue. Parks Associates forecasted an aggregate revenue opportunity of \$30 billion over the next five years on top of an existing market of roughly \$70 billion across nine categories of health and wellness products and services.

# Appendix

## Item A: Qualitative Study Demographics

A convenience sample of n=15\* caregivers from the New York Metropolitan area were selected to participate in a qualitative study consisting of ethnographic observation and in-depth interview. The demographics of the subsample is as follows:



\* Certain demographic items report on only n=13 caregivers, as two study participants provided only partial demographic information.

## Item B: Technology Functions Queried

In this study, caregivers were asked to respond to how likely they were to use existing technology functions to support their caregiving. The technology functions queried were selected by HITLAB and Project Catalyst to represent those currently available on the marketplace at the time of study design. Technology functions were identified in a market research and landscape performed by AARP, which is reported in summary here<sup>12</sup>.

### Caregiving Functions

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1. Create calendars to organize schedules and upcoming activities
2. Create lists or spreadsheets to organize your daily responsibilities (e.g., picking up medication or groceries; upcoming doctor's visits)
3. Arrange refills or delivery of prescriptions
4. Share calendars to coordinate activities with others who help you care for your [loved one] (family members, friends, and/or professional caregivers)
5. Alert you if your [loved one] requires urgent care (e.g. if they fall or have an urgent health need)
6. Share lists to coordinate activities with others who help you care for your [loved one] (family members, friends, and/or professional caregivers)
7. Aid your loved one's ability to carry out daily activities (e.g. raise toilet seats, climb stairs, use telephones)
8. Social media or social networking
9. Get immediate professional healthcare information or second opinions at any hour or day
10. Monitor your [loved one]'s medication consumption
11. Personalized reminders or guidance about care based on your [loved one]'s health condition
12. Checklists and information to help you prepare for your [loved one]'s discharge from the hospital or care facility
13. Monitor your [loved one]'s 'daily patterns (movement around the house, opening/closing doors, bathroom usage, sleep)
14. Receive personalized information on the resources you need to provide care to your [loved one]
15. View guide or directories of services for funeral related needs
16. View directories with professional reviews of caregiving services (e.g. ratings from state inspection reports, seals of approvals, etc.)
17. Read other caregivers' ratings and reviews for various caregiving services, facilities and companies
18. Review, compare, contact and arrange for care after your [loved one] has left a hospital or care facility
19. Questionnaires or step-by-step guides to give you personal legal advice for end-of-life planning (e.g. filing for insurance for your [loved one], completing legal forms such as wills or choosing a medical power of attorney)
20. Watch videos about making care decisions and planning for long-term or end of life care for a loved one
21. Arrange grocery delivery to your [loved one]

## Caregiving Functions

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22. Questionnaires or step-by-step guides to give you personal financial advice for end-of-life planning (e.g. arranging professional caregiving services, filing for insurance for your [loved one], completing legal forms such as wills or choosing a medical power of attorney)
23. Arrange handyman or home repair services to your [loved one]'s home
24. Read articles and checklists about making care decisions and planning for long-term or end of life care for a loved one
25. Questionnaires or step-by-step guides to give personal advice on the type of care your [loved one] needs
26. Message or chat with other caregivers about their personal experiences with various care giving services and service providers
27. Personalized advice that considers your [loved one]'s condition to produce a personalized plan to prepare for their discharge from a health facility
28. Arrange cab rides or other modes of transportation for your [loved one]
29. Connect socially with other caregivers to share and learn from personal experiences
30. Information and resources on how to access services for emotional, mental health, or social support to help you manage the challenges of providing care to a loved one
31. Arrange meal delivery to your [loved one]
32. Select and purchase long term care insurance
33. Message or chat with other caregivers about providing long term or end-of-life care
34. Gain emotional or mental health support from professionals to help you manage the challenges of providing care to a loved one
35. Read about other caregivers' personal experiences and information on providing long term or end-of-life care
36. Contribute to or view inspirational stories about providing care to a loved one
37. Select and pay for services of professional in-home caregiver or home aide
38. Select and pay for an assisted living facility or other special care services

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