Next Generation Response Systems:

From Fear to Function

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Survey managed by

link·age connect™

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EXECUTIVE SUMMARY

Through the efforts of Linkage Connect in Mason, Ohio, a survey of 1114 adults age 55-100+ verified current assumptions about today's Personal Emergency Response System. These PERS devices today are advised by healthcare professionals, and are used more by older women who are living alone and worried about falling. In addition, those who have the device typically own the product for fewer than 3 years.

However, technology change, additional services, and new entrants will expand this traditional base of users from today's population to a younger and more mobile group, interested in being out and about, willing and motivated to monitor chronic disease status and/or patterns of behavioral change that could signal decline or onset of health issues. In addition, new uses for devices and services are emerging, including creation of platforms that enable integration with multiple devices and systems, personal interaction and engagement, concierge services, and overall wellness and activity monitoring.

The market – both payer/provider and consumer/family will segment by value and function to meet multiple levels of need as well as the pocketbooks of individuals, families and healthcare providers/insurers. Insurers and healthcare providers in particular will see these devices as a tool to help prevent re-hospitalization post discharge. Players in the market will enter from the security, carrier, remote health and activity monitoring, wellness categories – and fitness technology tracking. Those who succeed will have channel partnerships and distribution that best matches the service expectations of the customer, whether that is offered through home health care or resellers, referred and sold through today's hospital/healthcare referrals and resale, or marketed direct-to-consumer.

WHO SHOULD READ THIS REPORT

Technology platform providers

Telecommunication carriers

Investors and entrepreneurs interested in the market of technology for older adults

Businesses seeking to cater to an aging demographic

Service providers with an interest in serving older adults

Media organizations that track age-related issues

Social service agencies and not-for-profits focused on seniors

Government agencies and policy makers

Geriatric care managers

Caregivers, seniors, and family members

PERSONAL EMERGENCY RESPONSE SYSTEMS – WHO OWNS AND WHY

How the Survey was conducted. The questions were designed and developed collaboratively between Linkage Connect – which fielded the survey, Aging in Place Technology Watch for analysis and reporting, and the six sponsoring organizations – Philips Lifeline, Verizon Wireless, Care Innovations, Great Call, Healthsense, and Numera. Survey questions can be found in Appendix A.
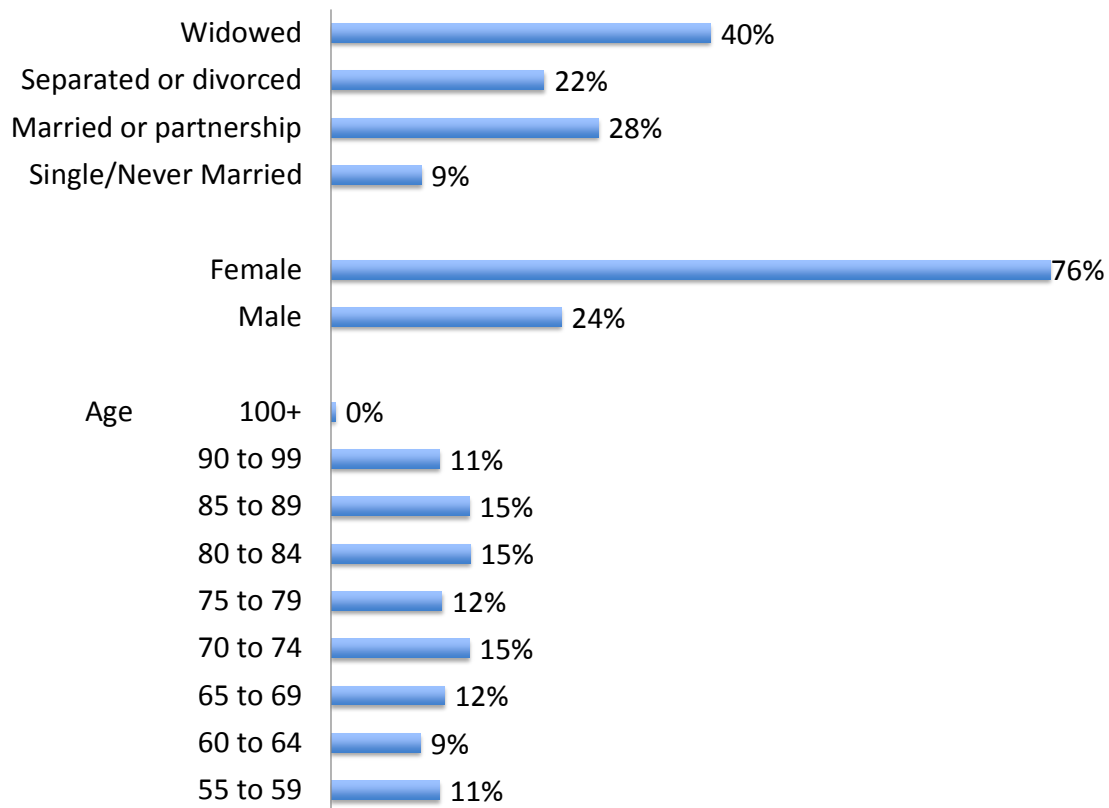

Figure 1-a   Who are the survey responders?[1]

Linkage Connect fielded the survey among its population that encompasses 122,000 individuals living in one of the following: low income housing, independently owned homes, continuing care retirement communities, and assisted living communities.

The paper survey was distributed to 3782 older adults aged 55-100+. Another 233 (29%) completed it online. A total of 1114 individuals responding during the 4-week survey window: 76% were women, 67% were over the age of 70, 70% of the responders reported they live alone, and 57% of the responders had annual incomes under $25,000. Those who responded via paper were more likely to live alone, have a PERS device and be older than those who responded online. Sixty percent live in senior housing communities.
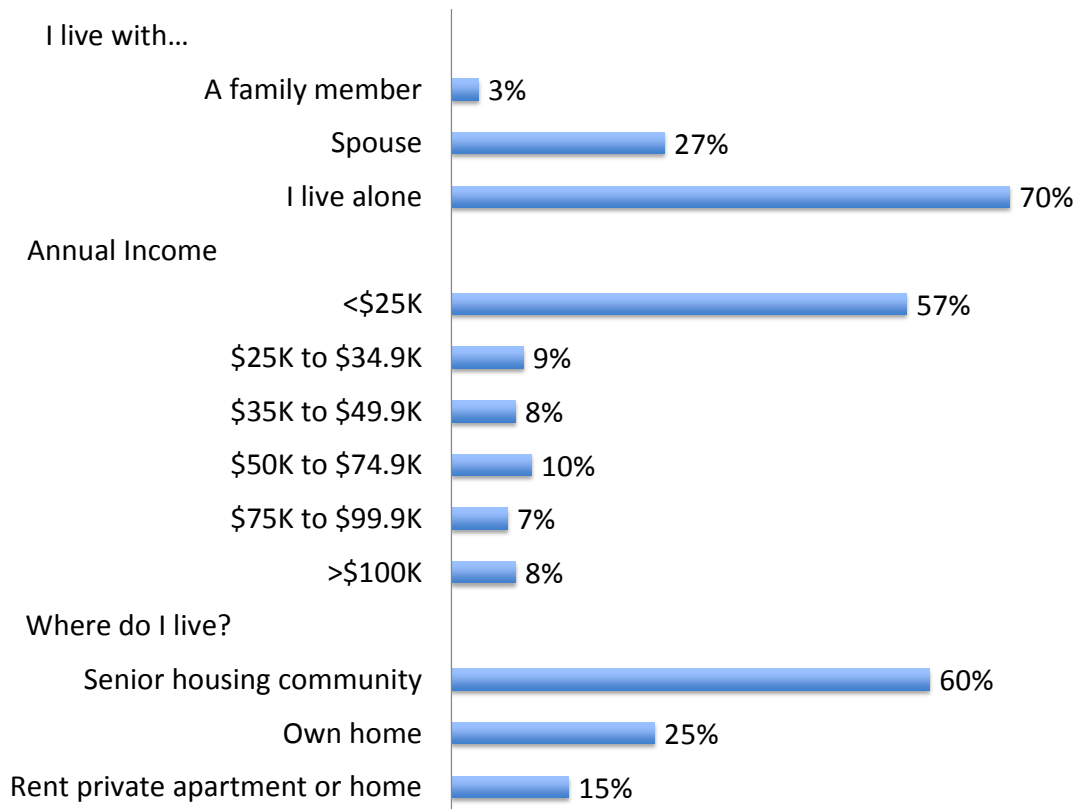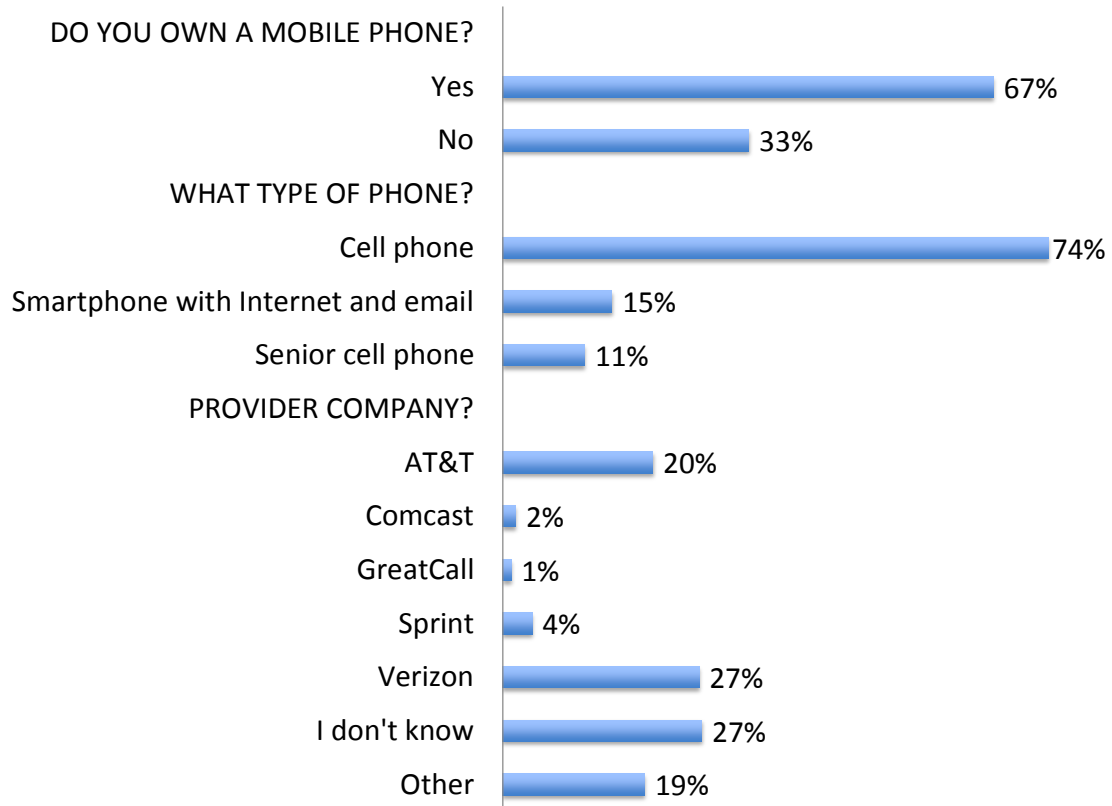

I live with…
- A family member: 3%
- Spouse: 27%
- I live alone: 70%

Annual Income
- <$25K: 57%
- $25K to $34.9K: 9%
- $35K to $49.9K: 8%
- $50K to $74.9K: 10%
- $75K to $99.9K: 7%
- >$100K: 8%

Where do I live?
- Senior housing community: 60%
- Own home: 25%
- Rent private apartment or home: 15%

Figure 1-b[2]

www.linkageconnect.com   www.ageinplacetech.com

DO YOU OWN A MOBILE PHONE?
Yes — 67%
No — 33%
WHAT TYPE OF PHONE?
Cell phone — 74%
Smartphone with Internet and email — 15%
Senior cell phone — 11%
PROVIDER COMPANY?
AT&T — 20%
Comcast — 2%
GreatCall — 1%
Sprint — 4%
Verizon — 27%
I don't know — 27%
Other — 19%
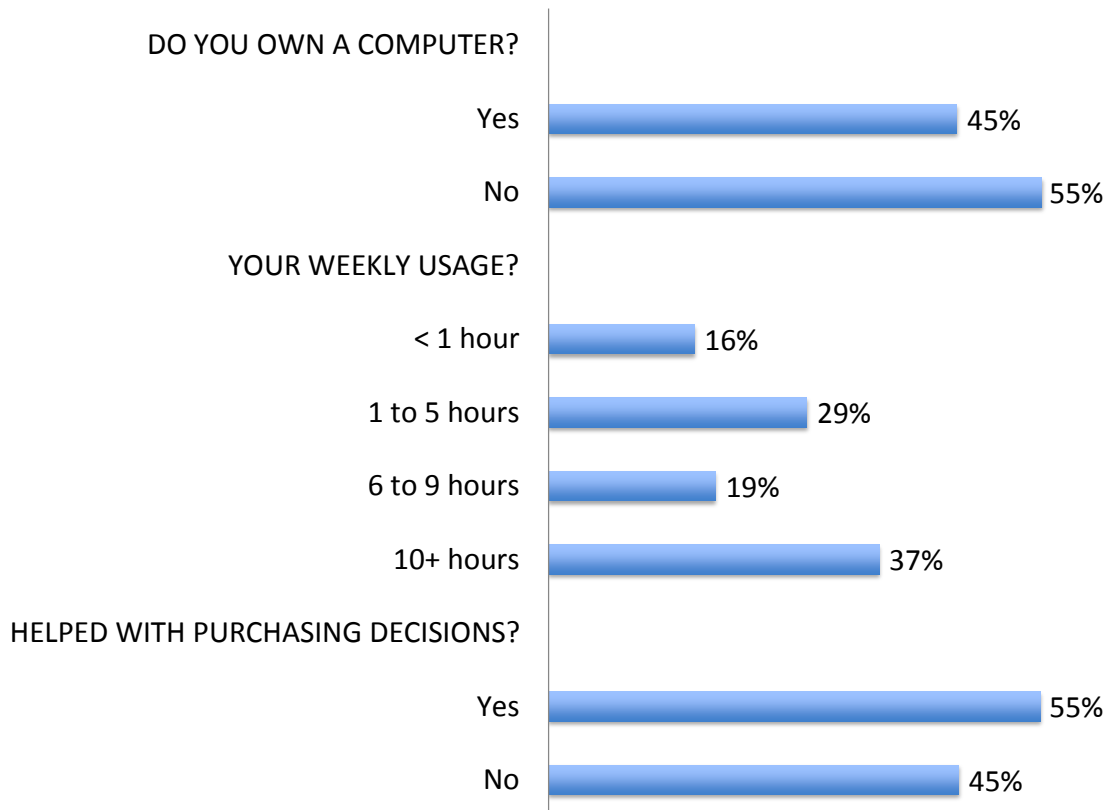
**Figure 2   All responders -- mobile phones[3]**

Figure 3 All responders -- use of computers[4]

What are the characteristics of PERS owners? Least likely to own a PERS device are those who are younger and those who are married or in a partnership relationship. The greatest level of ownership is in the age range of those to whom the product is heavily marketed – that is those who are in their 80s – 50% of responders in their 80s reported owning a PERS.

Of the 841 female responders (76% of the total), 36% of them own a PERS device, a similar percentage for men (although many fewer men responded to the survey). Ownership increases with age -- of the 33% of the responders who are in the youngest three age range groups (55-69), only 16% of them own a PERS device.

Fifty-two percent of PERS owners found out about the device from a healthcare professional – the next largest percentage of referral was 'OTHER': given that 60% of responders live in senior housing, referral was likely a professional from their community.
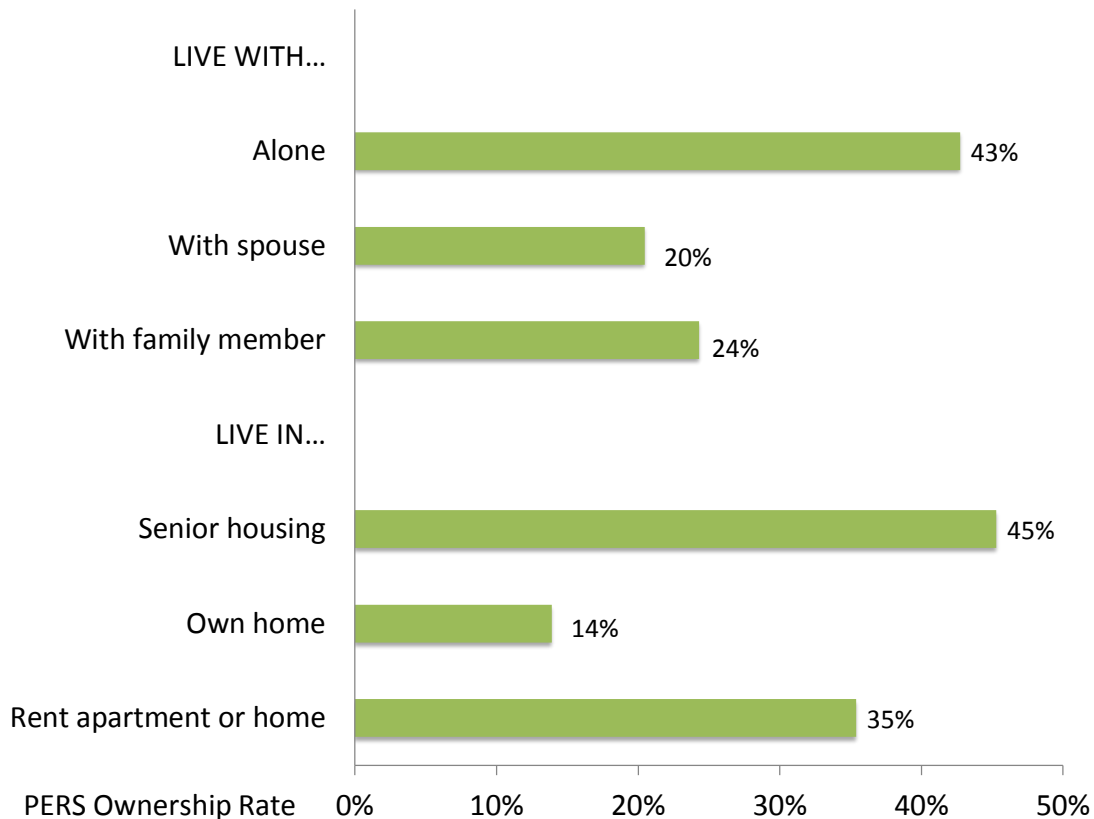
Figure 4 PERS ownership rate for responders who are…[5]
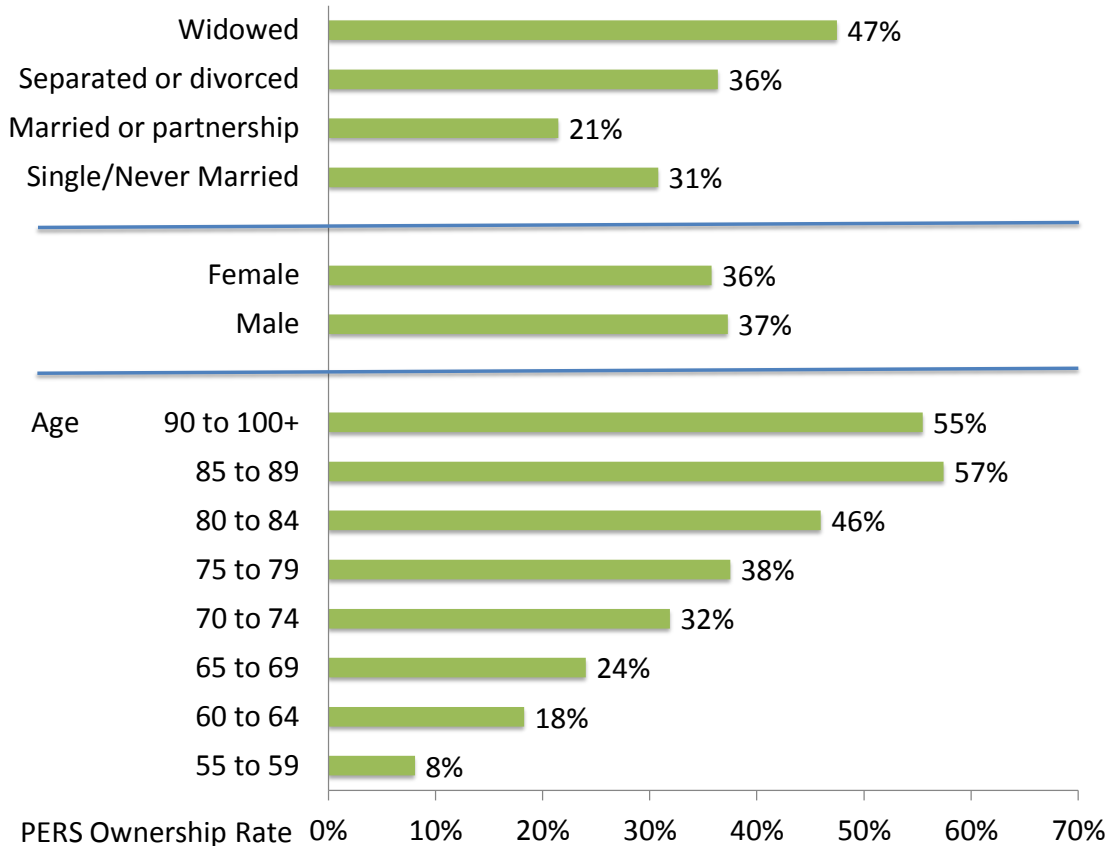
What are the living arrangements and characteristics of PERS owners? Those surveyed who live alone are most likely to own a PERS device, which is consistent with the owner's greatest concern – fear of falling and therefore not being found and conversely, those who live with their spouse in a home that they own are least likely to own a PERS device.
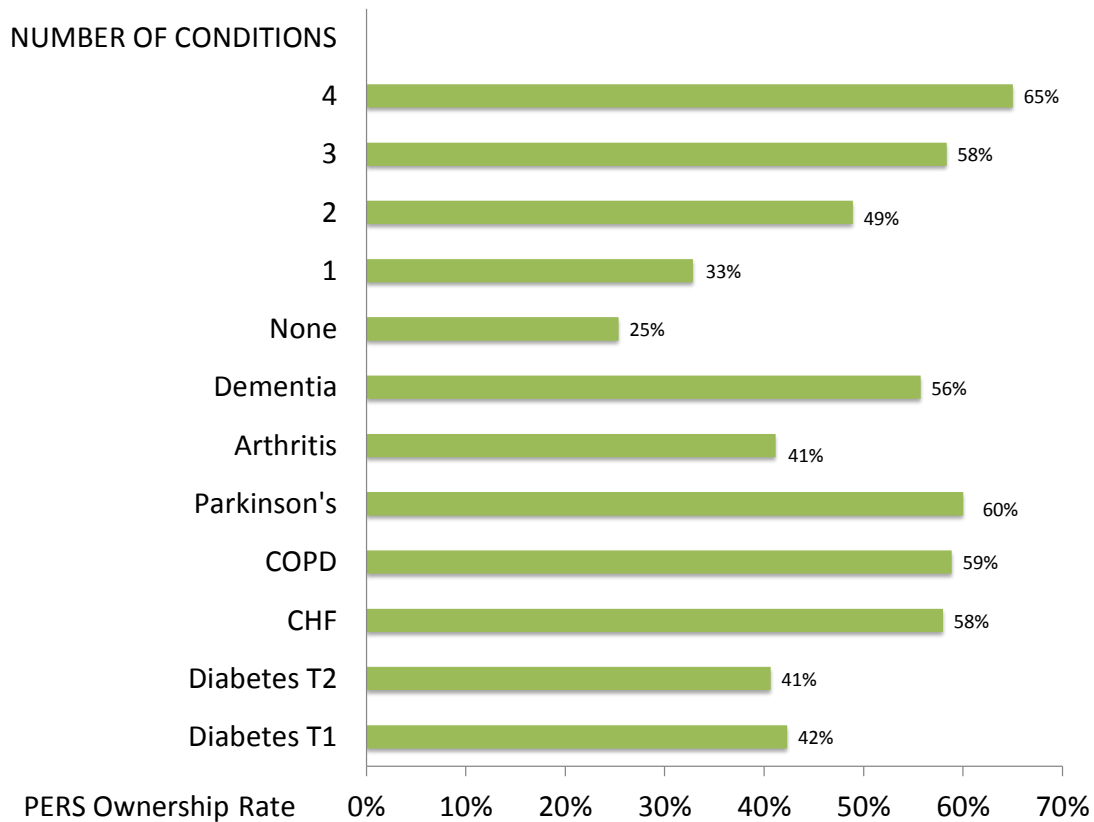
Those PERS owners living in a senior housing community typically have incomes under $25,000, are aged 75 and older, and are likely to live alone. Of those PERS owners living in senior housing, 59% acquired the device as part of the fee structure of their senior housing agreement, 24% had the device covered by health insurance or Medicaid, 14% bought it themselves. Thirty-nine percent of those who wear the device daily were provided the device by their housing community.

Figure 5 PERS ownership rate for responders who…[6]

Bar chart of PERS Ownership Rate:
- LIVE WITH…
- Alone: 43%
- With spouse: 20%
- With family member: 24%
- LIVE IN…
- Senior housing: 45%
- Own home: 14%
- Rent apartment or home: 35%

Chronic conditions drive PERS ownership. The primary reason cited for owning a PERS was a concern about falling, followed by concern about living alone, then personal safety, with medical condition cited by only 15% of the owners. However, as this chart shows, the greatest level of PERS ownership among those with chronic conditions were those who acknowledge having 2 or more chronic conditions. These conditions (like Parkinson's or heart/lung conditions) are often correlated directly with a risk of falling – aka the primary reason to own a PERS device.[7]

Figure 6 PERS ownership rate for responders who have…[8]

Bar chart titled "NUMBER OF CONDITIONS" with x-axis "PERS Ownership Rate" ranging from 0% to 70%:

Category	PERS Ownership Rate
4	65%
3	58%
2	49%
1	33%
None	25%
Dementia	56%
Arthritis	41%
Parkinson's	60%
COPD	59%
CHF	58%
Diabetes T2	41%
Diabetes T1	42%

PERS – UNCHANGED, UNDER-UTILIZED FOR 30 YEARS

"Among those who need support to stay independent, fear of falling is almost as bad as the fall."
– Randy Swanson, VP Business Operations, Care Innovations

Fear of falling, much of it generated by fear-inspiring advertising, has precipitated and sustained an entire market. These products and services are designed for worried family members of the over-80 population of mostly female seniors living alone. For the past 30+ years, this doctor-recommended and advertising-driven segment has evolved into a $1-2 billion marketplace of mostly private pay customers, mostly women living alone, who typically keep the product from between 1 and 3 years -- as this survey confirms.[9]

- **Traditional devices offer single purpose with limited range.** Up until recently, the PERS device (aka Medical Alarm, Medical Alert) has traditionally been a 'press when you need help' design that works if the user is within 600 feet of an in-home base station unit. More mobile devices have been introduced during the past few years that can pinpoint a location of the device owner on a map, but the current market is still dominated by the limited-range offerings.

- **The device has been recommended, owned -- but not worn.** PERS devices have been frequently suggested after a fall or to those who are deemed to be a fall risk. There were few surveys about PERS usage prior to this report; the most recent was the British Medical Journal in 2008 which demonstrated what family members already know: many older adults do not wear the pendant bought by their adult children, typically not wanting to appear old. And if worn, most do not press the button, not wanting to bother other people.[10]

  "An individual who is at risk and cannot get up from the floor without help should be offered PERS." – Debra Rose, Co-Director, Center for Successful Aging, Cal State Fullerton

- **Most calls have not been an emergency.** The percentage of calls that are actual emergencies (versus testing the device) is widely cited (though not publicly documented) as being fewer than 5%. The remaining calls, ostensibly to test that the device works, are calls placed out of loneliness, depression, or some concern other than falling and being unable to get up. Call center reps have reported conversations about heating/cooling issues, in-home dangers, and health.

- **Nickname of 'medical alert' is a misnomer: the device itself has not been medical.** After an incident like a fall, a PERS device is sometimes resold by doctors as a 'medical' device, but what that is can be subject to interpretation: even though the Federal Government treats it like a medical product, it typically has no integration to

any care delivery or medical treatment. However, FCC certification is required and registration of the service provider is mandated in many states before the product can be sold.[11]

"We need to encourage the powers that be to craft regulations that are appropriate to the class of service." – Jonathan Hinz, Associate Director, Verizon Wireless

MARKET INERTIA LEAVES GAPS IN FUNCTIONALITY, PROVIDER, PURPOSE

Historically, PERS vendors of devices and/or services have spent fortunes marketing fear on noisy print and TV ads. The result has been a set of customers forced to make an all or nothing decision on a one-use-fits-all device —resulting in limited usage**.** Furthermore:

- **High price/low function – device is purchased late, owned briefly.** Current devices live down to the limitations and expectations of their users. The price point (average of $29/month) is too high for some and is owned for too short a duration – 69% of survey responders who owned a PERS had it for fewer than 3 years, 27% for less than one year. Thirty-seven percent were worried about falling, and 15% cited a medical condition as the reason for purchase.

  "Age is a marker, but a life event is a bigger driver of PERS purchases." – Richard Lobovsky, VP Business Development, Lifecomm

- **Data is captured – but not used.** Each button press or device movement is a data element that could be collected and summarized, but typically is not, to signal pattern of behavior or predict future decline. These patterns could help PERS devices address the needs of specific chronic conditions like dementia in older adults, as well as conditions that may affect younger people, including epilepsy or Parkinson's disease -- areas the PERS market has barely penetrated.

  "The absence of data archiving and analysis with classic PERS providers is a self-imposed barrier to shaping the next generation of services -- which should be built on intimate communications with the support network of the PERS end-user." – Bill Lyon, Former President, Visonic, Americas

- **One size fits all – but lacks personalization based on need or role.** Caregiver, patient/care recipient, family, professional/healthcare are all roles played in the circle of relationships around a PERS wearer – but there is little ability to give each audience what they need to help ensure patient safety, even though the circumstances precipitating a purchase may vary widely and the wearer's risk of falls may be driven by one or more chronic conditions. For example, with systems that detect changes in

gait or frequency of nighttime bathroom trips, patterns of behavior may signal an oncoming infection or worsening arthritis. The information transmitted could be viewed by a nurse, monitored by a family member or alert a professional home care agency.

- **Market is changing -- businesses-as-usual may be left behind**. New technologies, new device substitutes and broader interest in the space provide a variety of signals for change. Up to now, security dealers view PERS as an add-on to a home alarm system, and health care referrers see it as a way to make a transactional suggestion or sale. But with growing market interest in telehealth, PERS should be viewed as part of a larger wellness solution.[12] Thus within that context, to remain the same is to lose ground -- by milking the market, vendors are inadvertently creating an opening for innovation in channels, devices, functionality and add-on service offerings.

What has emerged to fill gaps in need and enhance the value of the market?

Because new technologies can be used to provide new types of services, they will be leveraged by vendors (both new and existing) for additional:

- **Functionality --- dementia care, concierge services and caregiver communication.** Wander/geofence capability will be an increasingly important category as many more with dementia remain living at home. Meanwhile, isolation/social engagement is an opportunity for PERS services beyond emergency. For example: GreatCall's Five Star responder has added services to a cell phone customer's contract, like the ability to pose a question for a nurse, doctor, or check-in for a worried adult child. Geo-fencing (setting a region through an online tool that warns if the border is crossed) and bread-crumbing (tracking paths for retracing) could help locate those with dementia, seizure disorders, or at risk of heart failure. These features put the PERS industry into a different wander management arena from pet and teen trackers or door lockdowns to prevent 'elopement.'[13]

- **Providers outside of security and healthcare that see opportunity.** Carriers see the chance to add services on top of existing monthly charges. The 'Quantified Self' wave of devices (Fitbit, Jawbone, etc.) offers a clue to the directional change – providing passive but proactive response systems that are personalized to the user – Jawbone's UP vibrates and alerts after a predefined period of inactivity or sleep. In the future, we will see products morph to track the Connected Self – beyond quantification, adding profiles of wellness (or chronic disease) to an existing baseline of step tracking, fitness, or inactivity detection.

"The more passive (with opt-in consent) you can make the system, the better. Make it blend into the background so the elderly client doesn't have to do anything." – Michael Dempsey, Harvard Medical School and Independence Labs

- **Applications for the product – the Connected Senior.** Wellness matters. But the new players in the increasingly crowded Quantified Self domain do not picture themselves selling to a senior market – leaving service providers and carriers to see the possibilities, possibly partnering with senior housing and home care agencies to offer 'Connected Senior' suites of in-home and outside products and services. For example, Verizon's SureResponse service is delivered through VRI's 24-hour monitoring center, offering talk 'concierge' minutes that the wearer can use to press the button to request directions – or even pizza delivery.

- **Expectations of service beyond simple response.** As new entrants' offerings become more widely marketed and known to adult children as well as seniors, the market's channel intermediaries, both referrers and resellers, will help move the age range of seniors for PERS usage move lower on average, perhaps by five years or more.

  "Innovation in this market has been too slow. There is a more mobile user that can benefit from the service – perhaps 10 years younger. Lowering cost and raising the feature set will force providers to think more about software than hardware." -- David Inns, CEO, GreatCall

FROM HOMEBOUND EMERGENCY TO BROADER MONITORING AND VALUE

Scenario 1: Mrs. Jones, age 76, lives alone and has recovered successfully from a recent hip fracture and is pleased to be up and out and about, driving in her car and going for walks, although TV ads leave her a bit worried about falling in or around her home and being left alone for a long stretch of time. She has recently been given a new pendant that enables her to talk to a staffer in a 24-hour response center, with a monthly permitted talk time of up to 60 minutes – she likes the security and welcomes the chance for a conversation – and even a chance, just in case, to talk with a nurse or ask for directions.

One plus one equals three -- next generation response systems combine device and data. Next generation response systems (NextGen) will transcend limitations of traditional PERS. Isolated devices and services, when brought together, produce a richer offering targeted and adapted for selected markets, prices and customer profiles. Prospective markets exhibit a range of circumstances beyond age -- including personalization based on circumstance and role, integration into other appropriate systems, or better learning based on patterns of behavior (see **Figure 7**).

"When an adult child calls a parent, the parent feels nagged. Yet when the parent shares their daily lifestyle activity with loved ones, the adult child gains better insight of how they're taking good care and the conversation changes to celebrate their independence -- not challenge it." -- David Glickman, Co-founder, Lively
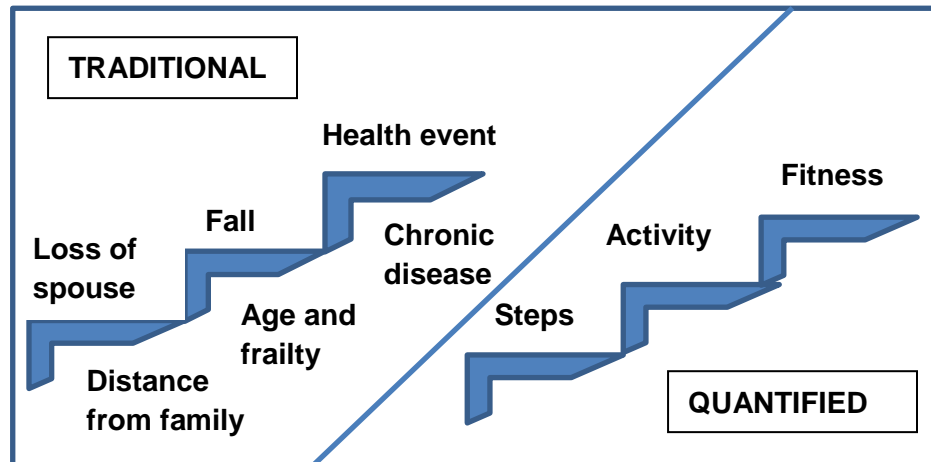

Figure 7 Staircase of usage via life events: personalized, quantified activity

Characteristics of Next Generation Response Systems (NextGen)

To expand market potential and serve a broader range of consumer needs and applications vendors will offer Next Generation Response Systems (NextGen) that are personalized (see **Figure 8**).

- **Personalized.** Instead of the binary behavior of traditional PERS, emergency or not, NextGen systems will enable multiple and individually configured service levels and usage types -- from wellness monitoring to communication to concierge services to emergency notifications. Not only for professionals, long distance family members and caregivers want a window to what is going on and should be able to see meaningful variations that are causes for action.

From Current PERS	To Next Generation (NextGen)

Emergency response
 	
Press button to reach responder
Focus on in-home elderly
Standalone device
	Health and safety systems
	
	  Passive observation
	  Light touch engagement
	  Health and wellness aware

Security dealers and monitoring centers	Pharmacy, Insurers, Retail, Quantified Self vendors, senior housing, consumer, carriers – transmitting to health providers and families
One size	Personalized from baseline pattern
Fear-based	Solution-based on individual need, whether it is cognitive, medical, physical or activity
Transactional (Need help now)	Aggregated from/to multiple sources through platform Wellness monitoring (activity, chronic disease); trends and guidance for caregivers

Figure 8 New offerings reflect variability of the user and channel

- **Integrated.** Even though they may have the most basic health profile or step and activity tracking of an individual, NextGen devices are just gadgets until they link and learn. Linking to other relevant health systems that contain, for example, current medication schedules; learning patterns of behavior over time to be able to detect changes that may turn out to be significant.

  "We need to be able to detect perturbations in the normal system – little things can make circumstances so much worse." – Laura Carstensen, Stanford Center on Longevity

  "While comprehensive integration may be many years away, providers can select solutions that integrate data to help them improve care, efficiency, and quality, limiting redundancy and the cost of care." – A.R. Weiler, CEO, Healthsense

- **Intelligent and adapting.** Because NextGen offerings are connected to systems that track patterns and variations from baselines, they will offer a service that is both intelligent about context of the information and adapting to changes over time –

learning to distinguish between today's normal behavior and a change in pattern that may signal a problem – or a new normal.

"We envision innovation like adding algorithms to data that is collected from our devices. We have done so with our fall detection service; algorithms continue to get smarter, providing beneficial information for users, caregivers or healthcare system." – Rob Goudswaard, Senior Director, Philips Home Healthcare

"Within the next five years, we envision sensored living spaces and flexible video conferencing so that active adults could stay independent as long as possible." – Marjorie Skubic, Marilyn Rantz, University of Missouri

> **Scenario 2:** Mr. Smith, age 83, lives alone since the death of his wife and suffers from mild cognitive impairment and some mobility limitations due to arthritis. He has been given a PERS watch which displays a message that reminds him to take his pills and even encourages a periodic check-in with family members whose name/number were identified when he was enrolled – or a call center if they cannot be reached. Because his health profile has been established at startup, call center representatives can confirm his current medication doses and are trained to contact family if there is a variation between meds he says he has taken and those identified in his personal health record in his profile.

Capabilities of Next Generation Response Systems will be based on Function, Value

High function, high value/price. Some organizations will want to deploy response systems that have a wide variety of selectable features and can be combined with other systems and information sources, potentially combining NextGen information with health IT, security, wellness, behavioral motivation and/or data. These requirements will drive a response system that includes (see **Figure 9**):

- **Platforms for integrating with other devices and organizations.** Add blood pressure cuff or weight scale variations and check-ins; combine the information from these devices with health records and other provider-maintained records.

  "Analytics about weight will remain the same even if there is a newer scale." – Kian Saneii, CEO, Independa

- **Pattern detection and prediction from captured and analyzed data.** Because PERS devices will be capable of tracking gait and other activity changes over time, they will be used to learn behavior patterns first and then be able to identify variations that may signal dementia, increasingly frailty or other types of decline. A senior

living alone may spend too much time in a chair or a worker becomes disoriented, becoming lost or endangered.

Scenario 3: Thirty-year-old Fred Martin works as night security guard at a new building site – his movements are predictable and his patterns are the same each evening. His device has learned and recognizes those patterns – and the system to which it is connected is alerted when it is being worn. If no movement is detected for a previously configured period of time or he suddenly drops to the ground, responders will attempt to contact him and will dispatch an emergency unit if he does not provide a response.
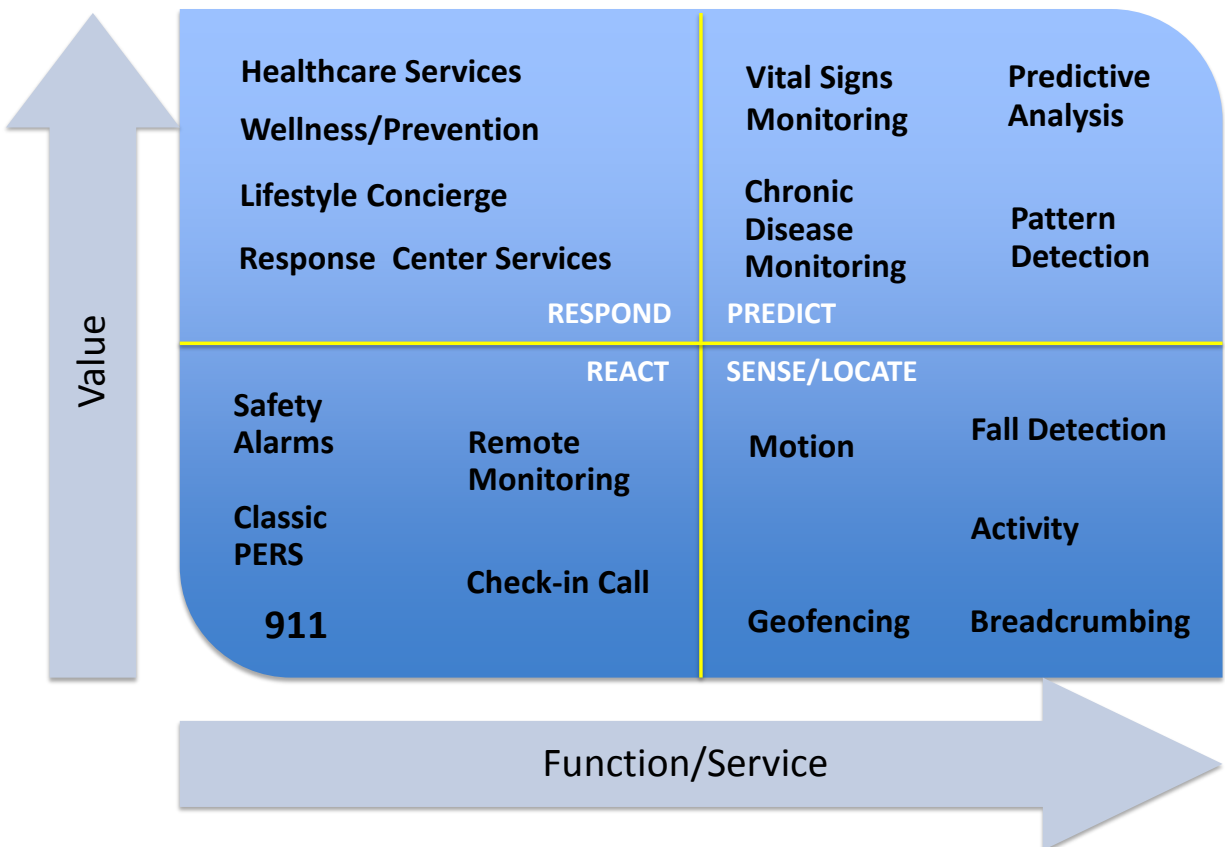

Figure 9 NextGen offerings multiply and vary by functionality and value

Lower function, lower value. Selected and configured for individual need, at the lower end, Next Generation Response Systems may not learn patterns of behavior, but will provide functionality to offer:

- **Mobile with two-way voice – and motion awareness.** Two-way voice monitoring has been a stable service of PERS vendors for at least two decades, with responses provided through multiple tiers of coverage – within the home and now through mobile devices that are waterproof or water resistant. Mobile PERS devices will add features and morph over time into something new, for example, Smart Monitor's motion detection that can be used for detecting seizures.[14]

  "I sort of liken the changing PERS landscape to Apple: putting music on everyone's hip and then, all of a sudden, they snuck in and got our phones." – Brenda Stuglik, Director, Marketing, MobileHelp

- **Link to family members first with expanded services from response centers.** Device service levels can be configured to call families or staffed monitoring centers who offer triage services – determining whether and from where emergency vehicles should be dispatched or whether an individual is simply calling for a reassuring chat.

  "We need an accurate idea of when to release emergency personnel – so we encourage check-in pushes of the pendant button." – Jonathan Hinz, Associate Director Verizon Wireless

- **Location tracking and breadcrumbing.** Acknowledging the rise in numbers of individuals with early dementia, just as Google Maps and location services can pinpoint your location on a map if you opt in, so will NextGen mobile PERS offerings, using combinations of GPS and cellular towers, find your location with reasonable precision.

  "We typically are seeing younger customers using mobile PERS devices than traditional PERS; ones that value outside activities like walking the dog, golfers and even elementary school children told by their parents: "If you need me, press this button." – Andy Schoonover, President, VRI

What does the future hold for Next Generation Response Systems – and beyond?

With new entrants and new functionality, the PERS market is being energized by new-kid-on-block offerings – some from traditional vendors – like Philips adding its GoSafe mobile offering, some from carriers adding a mobile device, like Verizon's SureResponse, and some from lower price, lower function services like GreatCall's. As the next generation response system market matures:

Market bifurcates based on value and function. Some devices will integrate with enterprises and support passive and wireless health tracking, perhaps prescribed by doctors or covered by insurance (as with today's Durable Medical Equipment/ DME market), or perhaps be integrated with a specific healthcare provider system. But other vendors will seek the low price point/purpose ground, minimizing scope to match the limited use expected by their customers. For example, LogicMark's FreedomAlert has a single price and no service fee to contact their family members.

- **Platforms enable personalization and extensions to multiple varieties of device.** With the heightened interest in the various telehealth, mHealth and Digital Health chronic disease tracking devices, platform vendors will design interfaces to connect to all and any. These platforms will comply with standards, enabling a broad range of connected health or motivational devices for activity tracking or behavior modification. Several vendors are declaring themselves as platform providers, including Qualcomm, Independa and Numera.

  "There is a real need for a minimalist solution that is low cost, performs well, and extensible to include the health and wellness component. Consumers, family members, and providers can expand to other services for low incremental cost." – Terry Dusterhoeft, Former CEO, Honeywell HomMed

- **Body area networks will overlap with response systems – enabling the Quantified Senior Self.** Just as telehealth collided with PERS in 2012, body area networks comprised of sensors transmitting to web-based tracking systems will intersect the market for Next Generation Response Systems over the next five years. Devices for quantified and connected selves will saturate their fitness-oriented markets and look to expand into the ever growing world of aging boomers and seniors.[15]

  "We believe a larger opportunity will include not only safety, but also wellness -- such as wearable health sensors – but targeted as a device for consumers healthy aging." – Tim Smokoff, CEO, Numera

- **Insurers will view NextGen services as a means to avoid hospitalizations.** In 2012, the health care industry and insurers realized that one way to avoid unnecessary re-hospitalization and a penalty was to maintain post-discharge contact with their patients. Over the next few years, that realization will boost interest in monitoring them remotely. For those patients most likely to return to the hospital, health professionals will recommend purchase of or provide a NextGen PERS device that is specifically configured for an individual patient's condition type and notifications. Within the next five years, CMS will examine its innovation grants and various nationwide pilots, initiating Medicare coverage of telehealth devices – including NexGen response devices/services.

Recommendations to vendors

The emergence of NextGen offerings will require vendors and their channels of distribution to abstract interfaces that enable them connect to appropriate and evolving systems and databases. Those that have the resources may create platforms that support a future range of devices and features (see **Figure 10**). Others will simply want to link into those platforms. To succeed:

- **New vendors must bring comprehensive skills and channels.** To sustain the attention of a broader and younger market, new players seeking to track and predict behavioral changes will need to staff up and recruit 'Big Data' management skills to derive meaning from patterns.[16] They will also need access to new channels that transcend the safety orientation of traditional PERS and reach wellness and lifestyle customers, smart software interfaces that enable connection to yet-to-be-named systems, hardware that serves as a platform for added devices and services -- simple to configure with a compelling, engaging, non-threatening user experience.

- **Traditional vendors should expand services into new areas.** Traditional PERS vendors risk losing market share to high function services and carriers like AT&T and Verizon with low-priced offerings. To avoid erosion of markets and gain new customers, these providers should consider launching a new brand name to test new features. They should form new partnerships with wannabe enterprise players (health, pharma). They should contemplate filling the gap in poorly implemented E911 areas or imitate others with services for ask-a-nurse, consult-a-concierge or just-a-chat. These players should consider re-engaging in smart home and universal design initiatives, whether in home renovation, senior housing or new construction.

- **All vendors should cultivate the consumer market.** Insurers will only reimburse (Medicaid, Medicare Supplemental plans) for use of products that meet their price and service specifications. Healthcare organizations, pending changes in CMS and other government programs, may pay directly for devices/services that keep individuals out of hospitals and nursing homes. But beyond those examples, the

consumer – family or the wearer directly – is the buyer who must be found and targeted with marketing messages that transcend fear – and help the wearer achieve a life of greater wellness, activity, and thriving.
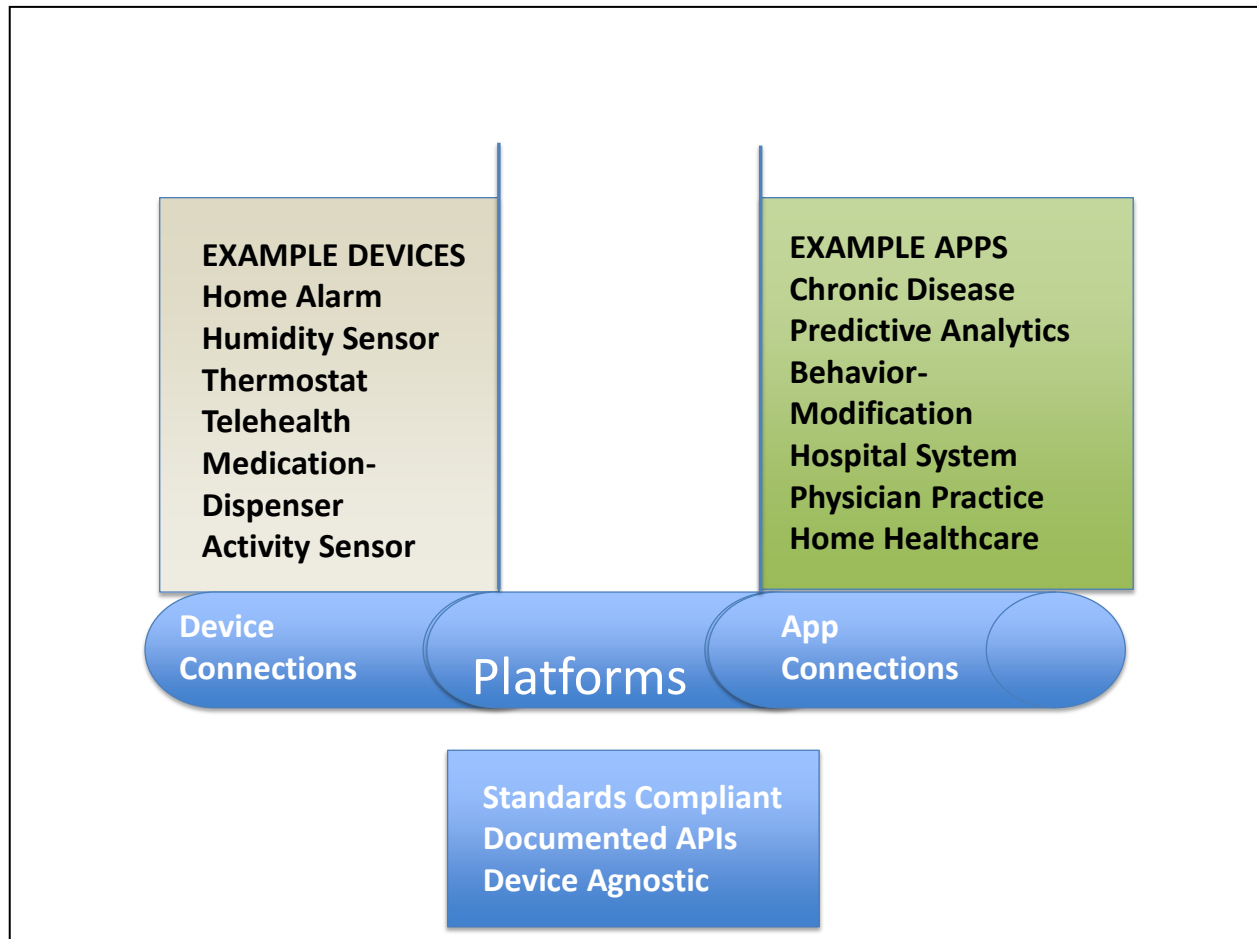

Figure 10 NextGen vendors will provide or integrate with platforms

INTERVIEWED FOR THIS REPORT

Dr. Jamie Huysman, VP Provider Relations, WellMed, United Health Care

Debbie Rose, Director, Center for Successful Aging, Cal State, Fullerton

Terry Duesterhoeft, Former CEO, Honeywell HomMed

Rich Lobovsky, VP of Business Development, Lifecomm

Tim Smokoff, CEO, Numera

A.R. Weiler, CEO, Healthsense

Randy Swanson, VP Business Operations, Care Innovations

Michael Dempsey, Harvard Medical School and Independence Labs

Marilyn Rantz and Marjorie Skubic, Professors, University of Missouri

Kian Saneii, CEO, Independa

Rob Goudswaard and Deb Citrin, Senior Directors, Philips Home Healthcare

Pete Celano, Founder of Alarm.com and BeClose

Liddy Manson, President, BeClose

Andy Schoonover, President, VRI

Jonathan Hinz, Associate Director, Verizon Wireless

David Inns, CEO, GreatCall

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APPENDIX A Survey Questions

1.   Please tell us your age? [numeric value, range age 55-100+]
2.   Are you a Male/Female [M,F]?
3.   Marital status? [Married or domestic partnership, single, widowed]
4.   Where do you live [Rent private apartment or house, own home, senior housing community]?
5.   With whom do you live [Alone, Spouse, Family member]?
6.   What is your income range [<$25K, $25K - $34,999, 35K - $49K, $50K - $74,999, $75K – 99,999, 100K+]?
7.   Do you have any of the following conditions? Please check ALL that apply.
a.   [Diabetes Type 1, Diabetes Type 2, CHF, COPD, Parkinson's, Arthritis, Dementia, None/No]
b.   Do you use any devices to monitor any of the above conditions? If yes, please specify.
8.   Do you own a personal emergency response device that notifies responders [Medical Alert/Alarm, Emergency Button or the like]?
a.   What type of device do you own? (Pendant, Belt Clip, Watch/Bracelet, Worn on Key chain, available through mobile phone)
b.   Where did you find out about this device [Health care professional, family, friend, advertisement on TV, advertisement on radio, advertisement in magazine, other]?
c.   What is the primary reason you acquired this device [I'm concerned about falling, I have a medical condition, I live alone, I'm concerned about my personal safety]?
c.   Who purchased the device [Provided by housing, provided by health coverage, family member, self]?
d.   What is the length of time you have owned the device [Just acquired, 6 months to 1 year, 1-2 years, 2-3 years, more than 3 years]?
e.   How often do you Use/Wear the device [Daily, occasionally, never used, stopped using]?
          If never used or stopped using, why [Don't need, concerned about price, makes me look old, other]?
f.   How often have you used it in an emergency [numeric value]?
9.   If you currently own or might possibly own a Personal Emergency Response device what are or would be the most important features? Please check your top three. [Is discreet, has a 24-hour response center, two-way voice, detects if I have fallen, allows me to choose who is contacted in an emergency, helps someone locate me wherever I am]
10.   Which form do you prefer or would you prefer in a Personal Emergency Response device? [Pendant, belt clip, watch/bracelet, worn on my key chain, available through my mobile phone}
11. If you do not own a device please tell us why. Check all that apply. [Don't need, concerned about price, makes me look old, other]
12.   Do you own a mobile phone [Yes/no]?
13.   If yes:
a.   Type of phone [Cell Phone, Senior cell phone or Smartphone]?
b.   Provider company (to whom do you pay your bill?) [AT&T, Comcast, GreatCall, Sprint, Verizon, I don't know, other]?
c.   If other: [free form]
d.   Do you have an emergency response service with your cell phone [Yes/no]?
14.   Do you own a computer?
          If yes: How many hours per week do you spend using your computer [less than 1 hour, 1 to 5 hours, 6 to 9, 10 or more]
15.   Is there another person in your life that you depend on to assist you in making purchasing decisions for health and other technology?
          If yes: Who is that person?

[1] Survey responses: Marital (n = 1106), Gender (n = 1110), Age (n = 1114).

[2] Survey responses: I live with… (n = 1098), Income (n = 1009), Where do I live? (n = 1105).

[3] Survey responses: Mobile phone ownership (n = 1081), What type of phone? (n = 757), Provider? (n = 811).

[4] Survey responses: Own Computer? (n = 1082), Weekly Usage? (n = 513), Purchasing Decisions? (n = 1060).

[5] Survey responses: Marital Status (n = 1083), Gender (n = 1088), Age (n = 1089).

[6] Survey responses: Live With… (n = 1076), Live In… (n = 1083).

[7] Those with Parkinson's disease have twice the fall risk as that of their aging peers.
http://www.pdf.org/en/fall09_fall_prevention

[8] Survey responses: Number of conditions - 4 (n = 20), 3 (n = 61), 2 (n = 232), 1 (n = 421), none (n = 380).
Particular conditions - Dementia (n = 61), Arthritis (n = 547), Parkinson's (n = 20), CPOD (n = 124), CHF (n = 119),
Diabetes T2 (n = 214), Diabetes T1 (n = 52).

[9] From Philips Lifeline executives as noted in a 2009 tour of their call center,
http://www.ageinplacetech.com/blog/visit-philips-call-communication-lifeline

[10] British Medical Journal, 2008, http://www.bmj.com/content/337/bmj.a2227

[11] http://transition.fcc.gov/Bureaus/Common_Carrier/Orders/1996/fcc96329.txt

[12] http://www.imsresearch.com/press-release/Healthcare_Reform_to_Boost_Growth_in_Telehealth_Market_by_55_Percent_in_2013

[13] Analyzing Missing Patients at the VA, http://www.patientsafety.gov/TIPS/Docs/TIPS_NovDec05.pdf

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