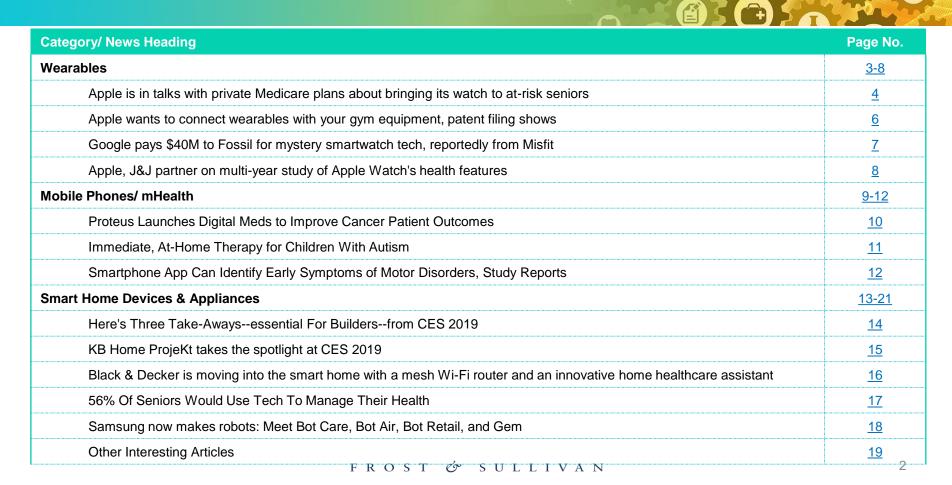


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Apple is in talks with private Medicare plans about bringing its watch to at-risk seniors – January 16, 2019 (1/2)



ANALYST TAKE:

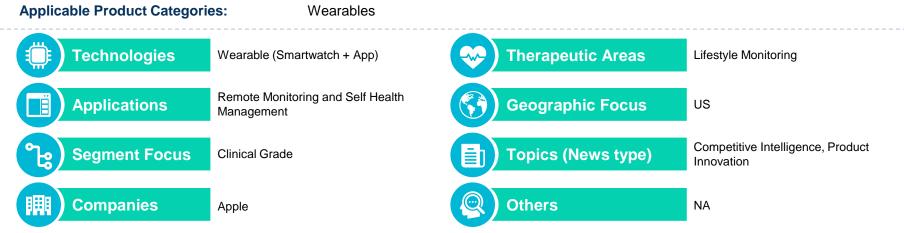
- Synopsis: As per CNBC report, Apple has been in talks with at least three private Medicare plans about subsidizing the Apple Watch for people over 65 to use as a health tracker, according to people familiar with the discussions. The talks have not resulted in any official deals just yet.
- Industry Needs: Based on CDC report, about 80% of Medicare costs result from 20% of the patients, who are elderly, with multiple co-morbidities such as diabetes, COPD, or congestive heart failure (CHF). Growing elderly population will increase the costs of health and social care systems. For example, In the United States, medical costs of fall-related injuries for 65+ people are about \$34 billion annually; this is expected to increase. Wearable devices that seamlessly integrate with elderly people help elderly people remain independent and live an active lifestyle.

Apple is in talks with private Medicare plans about bringing its watch to at-risk seniors – January 16, 2019 (2/2)

- Value Proposition: As part of its continuing efforts in healthcare, Apple has identified a new market of interest the Medicare Advantage population. As per CDC data, about 19 million people are enrolled in Medicare Advantage plans currently, but that number is continuing to grow with major insurers like Aetna and UnitedHealth announcing major expansion plans.
- As part of this potential deal, the discussions are centered around subsidizing the cost of an Apple Watch Series 3 or Series 4 -- which currently start at \$279 for the Series 3 38mm Aluminium version -- for older Medicare users who can't afford the cost of the device. Series 4 models would be most beneficial for elderly users, thanks to the new fall detection and ECG features, which retails for a minimum of \$399.
- Apple has previously signed a deal with insurance giants Aetna and United Healthcare for subsidizing the cost of the watch. Apple is in talks with at least three private Medicare plans in regards to subsidizing the Apple Watch for people over the age of 65.
- Frost & Sullivan views this a win-win deal for everyone insurers save money, patients get more personalized healthcare, and Apple sees its device
 proliferate all over the world and become a standard healthcare device. A real-time data collection device like the Apple Watch could give health plans a
 more up-to-date accurate picture of a patient's health which may also save money by helping to route patients to the most appropriate site of care.
- Frost & Sullivan also notes that seniors are a particularly good market for the new Apple Watch since it measures activity and heart rate and also includes fall detection sensors, all in addition to the new heart arrhythmia monitoring. The hope is that the watch will act as preventative care device, allowing doctors to catch abnormalities before they turn life-threatening, and even reduce doctor visits by monitoring wearers' vital signs.
- Considering this development, Frost & Sullivan views Medicare Advantage as a lucrative space for innovative digital health solution providers for potential
 experimentation in lowering healthcare costs due to its capitated model which allows for more flexibility in approach for providing care. Frost & Sullivan
 recommends innovative wearable solution providers to explore ways to map their solutions to current and future health and preventive care objectives of
 Medicare Advantage plans in the US market. Apple is not the only company targeting this new segment; emerging startups such as Devoted Health and
 Bright Health have also entered the space competing with complex data operations solutions.
- Target End-User: Public and Private Health Insurance Providers, Employee Health Programs

WEBLINK: https://bit.ly/2R0At8B

Apple wants to connect wearables with your gym equipment, patent filing shows – January 14, 2019



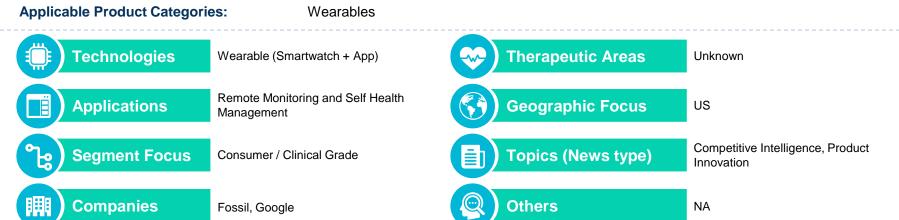
ANALYST TAKE:

- Synopsis: Apple has filed a patent application for technology that connects users with their gym machines in hopes of better health readings.
- Value Proposition: The patent application suggests that Apple is thinking about connecting its consumer products with public gym equipment like treadmills to deliver more accurate health data, using fitness equipment commonly accessible/used by average consumers.
- Frost & Sullivan views this as a possible capability extension to Apple Watch GymKit launched during 2017, in the overall growing health ecosystem around the Apple watch device. The GymKit application is compatible with Apple Watch Series 2 and above, and can work with any equipment in the gym. Given the new clinical grade ECG monitoring feature with Apple Watch Series 4, cardio equipment such as stress treadmills would make more sense both for Apple and the users. Additionally, the integration of gym data with critical vitals such as ECG, stress, and activity among would potentially help Apple to generate large data sets of individual consumers and leverage it for future research and validation of novel health and wellness applications.
- Target End-User: Average Consumer, Health and Wellness Centers, Gym Equipment OEMs.

WEBLINK: https://bit.ly/2SX1XgW

Google pays \$40M to Fossil for mystery smartwatch tech, reportedly from

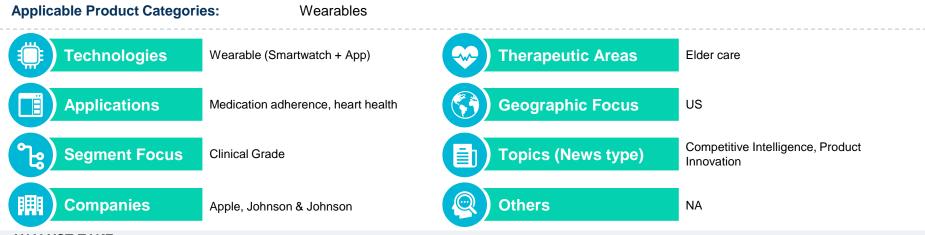
Misfit – January 17, 2019



ANALYST TAKE:

- Synopsis: Fossil Group announced its plan to sell intellectual property related to a smartwatch currently under development to Google for \$40 million. The deal includes undisclosed intellectual property as well as some R&D personnel.
- Value Proposition: Under the deal, a portion of Fossil's research and development team, who are currently supporting the transfer of intellectual property, will join Google. Smartwatches have been Fossil's fastest growing category after the company developed and launched the wearable technology across 14 of its owned and licensed brands. While the companies have not disclosed much about the technology in question, there is reason to believe it is health or wellness-related.
- Frost & Sullivan views this as a synergetic move from Google to make existing Verily Research Watch more consumer-centric, leveraging the expertise of Fossil's R&D staff, or it may plan to enter the consumer wearable segment, targeting personalized data to complete its research initiatives and data services. Up until now, the company has built an operating system, Wear OS, for smartwatches from other manufacturers. However, compared to the B2B Research Watch application segment, in the consumer segment Google has to face cut-throat competition from leading payers such as Apple and Fitbit.
- Target End-User: Average Consumer, Clinical Trials and Medical Research.

Apple, J&J partner on multi-year study of Apple Watch's health features - January 17, 2019



ANALYST TAKE:

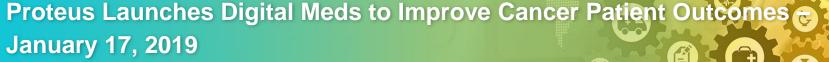
- Synopsis: Johnson & Johnson announced plans for a multi-year research program it will be launching with Apple to explore the role Apple Watches could
 play in senior health monitoring. The collaboration will investigate heart health outcomes and medication adherence among seniors, and is scheduled to
 begin in 2019.
- Value Proposition: Johnson & Johnson and Apple are teaming up to examine how their digital health tools, including the new Apple Watch 4 ECG app,
 might affect early detection of atrial fibrillation (A-fib). The companies hope to learn how wearable technology and digital health apps can advance stroke
 prevention.
- In the backlash of on-going Apple's talks with at least three private Medicare plans about subsidizing the Apple Watch, Frost & Sullivan views this deal as one more piece of the puzzle of Apple's bigger strategy to expand and monetize the Watch. Specifically, the primary goals of the research are to measure whether or not the smartwatch's irregular rhythm notifications and a medication adherence app designed by J&J for the smartwatch might have an impact on the health outcomes of older adults. This further validates Apple's strong plans to penetrate deeper into the healthcare space.

WEBLINK: https://bit.ly/2W3LCJb



Mobile Phones/ mHealth

Proteus Launches Digital Meds to Improve Cancer Patient Outcomes





Mobile Phones



Technologies

mHealth App; Digital Therapeutics



Therapeutic Areas

Oncology, Colorectal cancer



Applications

Ingestible sensor based digital cancer medicine



Geographic Focus

US



Segment Focus

Clinical Grade



Topics (News type)

Partnerships/ Value Based Care Models



Companies

Proteus Health



Others

Fairview Health Services; University of Minnesota Health

ANALYST TAKE:

- Synopsis: Proteus Health, in partnership with Fairview Health Services and University of Minnesota Health, has launched a digital chemotherapy for oral oncology therapeutics, with specific focus on stage 3 and 4 colorectal cancer patients.
- The clinicians at these health systems will be prescribing "digital capecitabine", a combination of the ingestible sensor, the established chemotherapy medication with the added benefit of remote care coordination through the Proteus digital platform. The company is also planning to launch a registry of all the real-world data collected through this initiative, to further enhance care pathways and remote monitoring of oncology patients.
- Frost & Sullivan believes that, in addition to enhanced adherence with treatment protocols, the solution would help patients easily self-manage the treatment and enhance remote care models, ultimately enabling them to stay on the therapy longer, avoid hospital readmissions and reduce costs. The insights gleaned through the data registry will enable greater understanding of key pain points of patients in terms of adherence and daily management of their disease condition, thereby enhancing care protocols.

WEBLINK: https://bit.ly/2syfmQT

Immediate, At-Home Therapy for Children With Autism - January 16, 2019





Mobile Phones



mHealth App; Machine Learning



Therapeutic Areas

General Wellness



Applications

mHealth app with Google Glass for treatment of autism



Geographic Focus

US



Segment Focus

Clinical Grade (under development)



Topics (News type)

Business Model Innovations



Companies

Google



Others



- Synopsis: A study published in the Nature Digital Medicine, has reported positive results for a solution enabling at home treatment of children suffering from autism. The solution consists of a machine learning enabled software system called "Superpower Glass", running on Google Glass and Android smartphone, which pairs with an AI enabled app that guides the wearers in having social interactions, reading facial expressions and making eye contact.
- The study participants were allowed to take the system home and use it on a regular basis to understand its effects. Based on positive results, Google has gifted 50 additional glasses for further clinical testing.
- Frost & Sullivan believes that the real value of the system lies in the software algorithm and the mHealth app which leverages machine learning and AI enabled tools to understand facial expressions. If developed and cleared, the system could be monetized as an app only model, which is agnostic of the hardware (the smart glasses) system, thereby enabling greater ease of adoption. That being said, Google would launch innovative bundled models to leverage the technology to add value to its Google Glass offering.

WEBLINK: https://bit.ly/2Rz3mgV

Smartphone App Can Identify Early Symptoms of Motor Disorders, Study Reports – January 15, 2019



ANALYST TAKE:

- Synopsis: Researchers at Kaunas University of Technology and Silesian University of Technology at Lithuania and Poland, respectively, have developed a smartphone app capable of leveraging inbuilt smartphone sensors and apply machine learning and computer simulation models on the data obtained through finger tapping and cognitive tasks assigned to the user, to diagnose signs of neurological disorders such as Parkinson's and Huntington's.
- Besides the above two, the model is easily adaptable to neurodegenerative diseases such as Alzheimer's, or conditions such as mild cognitive impairment.
- Frost & Sullivan research reveals that 2018 witnessed tremendous amount of ongoing clinical work at employing smartphone enabled tools to diagnose
 such neurological disorders, as evidenced by the four-year project initiated by <u>Aristotle University of Thessaloniki</u> and another one by the <u>University of Rochester Medical Center</u>. While, these solutions promise to reduce significant burdens off the shoulder of primary and long-term care systems to identify
 such degenerative symptoms early and manage them appropriately, there still needs to be consensus among the clinical fraternity on the efficacy and
 reliance of such systems.

WEBLINK: https://bit.ly/2SRzOaV



Smart Home Devices & Appliances

Here's Three Take-Aways--essential For Builders--from CES 2019 – January 11, 2019





ANALYST TAKE:

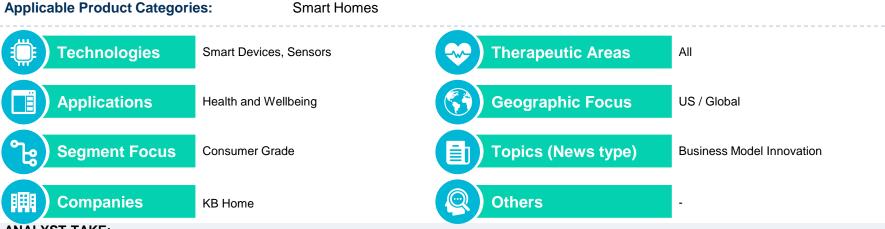
Synopsis: Addressing the gap between technology implementation and true meaning of a smart home, a move towards health and wellbeing (as outlined in the next slide) by some of the leading technology players, and builders becoming a part of the ecosystem are the three key takeaways for builders wanting to build smart homes as a differentiator.

Frost & Sullivan believes that for the entire smart home concept to move forward, even in the direction of health, all of the players involved need to come together to build an ecosystem of supporting partners – home builders, technology players, communication service providers and healthcare providers for health and wellbeing. The future is likely to see such consortiums being formed, which might also set up the standards necessary for this concept to grow further.

WEBLINK: https://bit.ly/2HhFDqK

KB Home ProjeKt takes the spotlight at CES 2019 – January 15, 2019





ANALYST TAKE:

Synopsis: "According to experts, roughly 40 percent of people who suffer from asthma experience exacerbated symptoms because of the air quality inside their home. Humidity, temperature variations, dust, and pests can all make asthma symptoms worse. Since we spend upwards of 90 percent of our lives indoors, investing in a smart home that automatically controls the climate according to your specifications can help to reduce these symptoms. Just controlling the climate inside a home can improve cardiovascular health, reduce the risk of lung cancer from radon exposure and improve mental health." "The KB Home ProjeKt has more than 400 devices integrated into the home that work together seamlessly." The concept integrates essential health and well-being factors in the home's routines, including sleep, air purity and comfort, water purity, diet and nutrition, etc.

While the concept is far from commercial availability, Frost & Sullivan believes this is the first step towards building a health and wellness oriented smart home. In parallel, the aging-in-place trend will result in development of chronic disease management and core healthcare oriented solutions. Integration of both will result in the smart home as envisioned by Frost & Sullivan.

WEBLINK: https://bit.ly/2Mo15jb

Black & Decker is moving into the smart home with a mesh Wi-Fi router and an innovative home healthcare assistant – January 10, 2019

Applicable Product Categories:

Bixby / Smart Homes Assistants



ANALYST TAKE:

Synopsis: Black & Decker is bringing Pria, a digital-assistant device, and Omni, a mesh Wi-Fi router to the market. "Pria is a digital assistant designed to help seniors age in place, instead of moving into a nursing home or an assisted-living center... Pria is a voice-recognizing digital assistant with a video component, but it's optimized for home healthcare—particularly for the elderly and the younger generation helping to care for them. It's designed to be as non-invasive as possible (it's HIPAA compliant), while allowing a caregiver to monitor the person's activity so they can ensure they're taking their medications, drinking enough water, going to the bathroom, getting enough exercise, and the like, without needing to deploy cameras and motions sensors all around the house or forcing the person to wear anything...Black & Decker expects to ship the device sometime in the second quarter and is anticipating a retail price of \$500 with a monthly subscription fee of \$40."

Frost & Sullivan notes that the Pria device looks identical to the one being commercialized by Pillo Health, but probably packs more Al punch than Pillo (but unclear as to how different these two will be). It is interesting to see a consumer electronics company also throw its hat in the ring with home health care offerings. [Stanley Ventures is an investor in Pillo Health.]

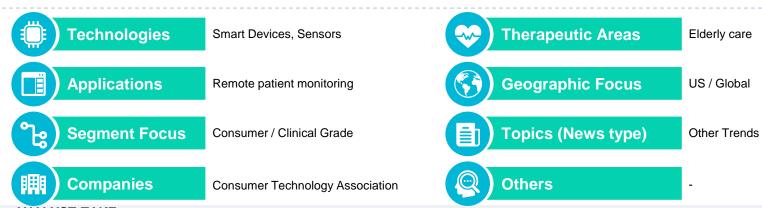
WEBLINK: https://bit.ly/2W0qtzV

56% Of Seniors Would Use Tech To Manage Their Health - January 11, 2019





- [Digital Health Devices / Tech]



ANALYST TAKE:

Synopsis: The Consumer Technology Association, also noting the growing interest of consumer electronics firms in health and wellbeing, conducted a market survey, to understand seniors' inclination towards use of digital health tech for managing their health. This also points to the aging-in-place segment being the prime target for most companies. "The CTA's research showed that seniors are open to using technology to manage their health, with 54 percent in agreement. The study also showed that seniors are familiar with some healthcare technology, with 32 percent being "very familiar" with emergency response solutions."

While there are more insights in the article on the finer nuances around remote patient monitoring and patient-generated health data, even from the point of view of healthcare professionals, Frost & Sullivan marks this as the first step towards the consumer electronics industry also focusing on health, and predicts that CES 2020 might see even more consumer electronics companies bringing health and wellness oriented features —most of them basic ones, but some may be advanced, possibly empowered by partnerships with healthcare organizations as well.

WEBLINK: https://bit.ly/2Cx2mQq

Samsung now makes robots: Meet Bot Care, Bot Air, Bot Retail, and Gem-January 11, 2019



ANALYST TAKE:

- The Bot care robot can help with most elderly support activities, but Samsung may want to look at customization for providing 'modules' for therapy support (think PARO robot for patients), or for serving in senior care facilities (not just patient homes directly), and take pointers from Blue Frog Robotics' Buddy. The same robot could help kids with education as well (Milo robot by Robokind).
- Bot Air is an interesting development for air purification. While details are unknown, a robot must pack AI and therefore also provide suggestions on outside weather and when to open windows, or close them. Being mobile brings the advantage of having one device that can cover the entire home, versus other solutions which require a dedicated device for each room or so. Some interesting features could be learned from AirboxLabs, Awair, Speck and Dylos purifiers and from other pure air monitoring products as well.

WEBLINK: https://bit.ly/2CxTZUq

Other Interesting Articles

When available, other interesting articles will be covered here in short.

| News Title | Link | Remarks |
|---|-----------------------------|--|
| How our homes became smart: The history of home automation | https://bit.ly/2M jJUPK | A good read on the history and drivers of home automation, beginning with the vacuum cleaner of 1901! |
| Xiaomi's five-year plan is a \$1.5 billion bet on smart homes | https://tcrn.ch/ 2M6eX1c | Xiaomi is planning to invest ¥100 billion (~\$1.5 bn) to bring the 'smarts' to connected homes. Its vision to use the 'AloT' concept (Al + IoT) is very similar to Frost & Sullivan's vision of what a smart home should truly be. Xiaomi is still competing with Baidu in the local market, but it hasn't been shy in the past to introduce its smartphones to a broader global audience. |
| CES Takeaway: As Internet of Things Grows, Chipmakers Stand to Benefit | https://bit.ly/2st Zr6e | While the article speaks of opportunity for chip makers (think Amazon making own machine learning chip), we would argue that the broader ecosystem is set to benefit, including communication service providers, from the trend of smart homes. |
| Cool Al Highlights At CES | https://bit.ly/2Q Td3BR | Intel-Alibaba partnership (interesting!) for real-time tracking of athletes (could be applied for smart-homes to track residents), Oral-B smart toothbrush with AI, Baracoda Group's smart bathroom inlcuding a mirror that tests your vision, and Pindrop's voice identity platform for smart voice assistants. |

Other Interesting Articles (continued)

When available, other interesting articles will be covered here in short.

| News Title | Link | Remarks |
|---|----------------------------|---|
| Smart home tech support? Buyers say no thanks to subscriptions | https://bit.ly/2F wCAzo | Contrary to Frost & Sullivan belief, Parks Associates report outlines a declining revenue for smart home product installation and maintenance services. A subscription based plan may not be used by buyers – a detailed voice of customer survey would perhaps help address the true need. |
| Apple hopes HomePod will be new growth driver: analyst | https://bit.ly/2R w1TrP | Apple is introducing its HomePod in the Chinese market, where the "domestic smart speaker sector saw a boost as many Chinese companies such as Alibaba, Xiaomi, Baidu and iFlytek Co poured into the market." With an expensive price tag, Apple may not fair as well in the Chinese market. |
| Project Alias hacks your smart speaker so it's only listening when you want | https://bit.ly/2A PR3mh | The DIY trend is likely to hit the smart home space in a big way. 2019, or perhaps 2020 maybe the year for several such hacks, or even online repositories of know-how (hosted on reddit or similar forums maybe). These would be good trends to follow for all companies to uncover actual customer needs. |
| AARP chief medical officer: Rethink aging with tech's help | https://bit.ly/2s vAcQU | Charlotte Yeh will be presenting at a HIMSS19 session called "Personal Perspectives: Using Technology to Improve Quality of Life as We Age." It's scheduled for Monday, February 11 at 8:45 a.m. to 9:45 a.m. in room W208C. |

Other Interesting Articles (continued)

When available, other interesting articles will be covered here in short.

| News Title | Link | Remarks |
|---|----------------------------|---|
| Smart home key to keeping seniors healthy at home, say execs at CES | https://bit.ly/2Q RVuCd | Best Buy's Health head Asheesh Saksena, and GreatCall CEO David Inns on the aging-in-place trend. Takeaway: "It is extremely clear that it can't be done alone." |
| Smart home tests first elder care robot | https://bit.ly/2F B2dyi | The Robot Activity Support System, or RAS, uses sensors embedded in a WSU smart home to determine where its residents are, what they are doing and when they need assistance with daily activities. The aging-in-place robot care market is booming with commerical applications, as well as research efforts (which it can be said have been ongoing for more than a decade). |
| What are some of the game changing healthcare tech from CES 2019? | https://bit.ly/2C scOZp | French startup New Health Community is also developing a patient care robot, names Charlie. "By adjusting its functions (via its integrated applications, games and connected objects) to the different needs of each patient, it facilitates the communication process between the patient and its medical team using a video conference application." |