FROST & SULLIVAN

Healthcare Market Updates

Weekly Newsletter

Issue 7

25th June, 2018

Table of Contents

Wearables

Walmart submitted patent for blockchain, wearable, biometric scanner-based EHR system – June 19, 2018

Applicable Product Categories: Wearables

Technologies	Wearable, Blockchain	**Therapeutic Areas**	Lifestyle and chronic health conditions/ Remote monitoring
Applications	Health Data Access and Security	**Geographic Focus**	USA/ Global
Segment Focus	Consumer/Clinical	**Topics (News type)**	Tech Innovation/ Competitive Intelligence
Companies	Walmart	**Others**	Apple, Microsoft, Google

ANALYST TAKE:

- **Synopsis:** Walmart submitted a patent application for blockchain, wearable, biometric scanner-based EHR system. The patent describes three key parts to the system which include; a wearable device in which the blockchain is stored; a biometric scanner for an individual's biometric signature; and an RFID scanner to scan the wearable device, ideally a bracelet or wrist band.

- **Competitive Intelligence:** Frost & Sullivan believes Walmart's ongoing investigation with emerging healthcare technologies such as blockchain and wearables, reflects its growing interest to monetize the digital health space, a strategy similar to those of companies such as Apple, Microsoft and Alphabet (Google) that have taken a swing to develop medical record tools. Based on Frost & Sullivan research, global healthcare Big Data and Analytics market will be $7.50 billion by 2020.

Walmart submitted patent for blockchain, wearable, biometric scanner-based EHR system – June 19, 2018

- **Value Proposition:** In the system described in Walmart's patent application for "Obtaining a Medical Record Stored on a Blockchain from a Wearable Device," the private key is held on a device such as a bracelet, and accessed by first responders using the wearer's fingerprint, iris, or facial biometrics. In addition to information for the blockchain database, the wearable device includes the biometric scanner and an RFID scanner to match the private key on the device to the public key. Given Walmart's reputation in the retail and consumer insights space, Frost & Sullivan believes the new solution will provide leading consumer wearable device companies such as Fitbit and Samsung a compelling ecosystem partnership opportunity, to efficiently mine critical health vitals and biometrics, and achieve their goals for creating decentralized and patient-centric medical record tools and services. However, till date, the efforts of tech and retails giants around medical records have received mixed reactions. For example, Google discontinued its PHR product in 2011 while Apple recently has opened its Health Records API to developers and researchers and said the PHR is now connected with more than 500 hospitals and clinics. Given this learning curve, beyond its technology play, Walmart's positioning of its future solutions will be the key to success.

- **Target End-User:** Healthcare consumers, homecare/ remote care settings, research and clinical trials sponsors, insurance and wellness programs.

WEBLINK: https://bit.ly/2K6O7nP

New patents strengthen dorsaVi's IP and support maintaining market leadership in medical grade wearables – June 19, 2018

Applicable Product Categories: Wearables

Technologies	Wearable (device + algorithm)	**Therapeutic Areas**	Keen Injury/ Arthritis/ Chronic Pain Management
Applications	Preventive Care, Treatment Adherence	**Geographic Focus**	USA/Australia
Segment Focus	Clinical Grade	**Topics (News type)**	Tech Innovation
Companies	dorsaVi	**Others**	NA

ANALYST TAKE:

- **Synopsis:** The US Patent & Trademark Office granted dorsaVi's patent application, "Method and apparatus for monitoring deviation of a limb". This patent protects the apparatus (the sensors) and also the method (the algorithms) that allows dorsaVi's sensor technology to estimate the deviation or tilting of the tibia, and indicates whether the knee and lower limb are well or poorly aligned.

- **Industry Need:** Among the all commonly reported chronic joint pains, knee pain is the most frequently cited conditions. A growing aging population and sedentary lifestyle are the biggest contributors to the increasing prevalence of knee pain globally. Based on recent research findings, the prevalence of knee pain is as high as 46.2% (32.2% in men and 58.0% in women) among the elderly.

New patents strengthen dorsaVi's IP and support maintaining market leadership in medical grade wearables – June 19, 2018

- **Value Proposition:** The new knee patent granted in the US would further protect dorsaVi's technology and commercial strategy for its wearable motion analysis technology. Till now the company has managed to get a total of 7 patent families with 13 patents granted across eight countries globally (USA, Europe, and Asia Pacific). Frost & Sullivan finds the new algorithm, which allows the assessor to determine whether the patient is at further risk of injury, as the differentiating factor apart from the device play. Considering the increasing prevalence of Anterior Cruciate Ligament (ACL) injuries and other knee injuries, these patents provide the necessary protection to allow dorsaVi to continue expanding into newer healthcare, as well as amateur or elite sports markets for highly specific products targeting specific injuries with the view of both avoiding injury in athletes and accelerating rehabilitation. Dr Andrew Ronchi, CEO of dorsaVi technology resonated the company's commitment to continuous innovation in his recent announcement stating, "The addition of this patent to dorsaVi's growing patent portfolio comes at an important time for dorsaVi as we are seeing increased interest from the market in the use of dorsaVi technology to measure lower limb movement. This patent will protect and support dorsaVi's commercial strategy moving forward."

- **Target End-User:** Post knee surgery rehabilitation programs, amateur and elite sports related injuries, and workplace hazards.

WEBLINK: https://bit.ly/2MLbu82

HeartBit teams up with IBM on a wearable ECG monitor – June 20, 2018

Applicable Product Categories: Wearables

Technologies	Wearable, AI	**Therapeutic Areas**	Cardiac health
Applications	Remote monitoring, Preventive care	**Geographic Focus**	Hungary / Europe
Segment Focus	Consumer	**Topics (News type)**	Partnership / Tech Innovation
Companies	HeartBit	**Others**	IBM, Alivecore and QardioCore

ANALYST TAKE:

- **Synopsis:** HeartBit, a wearable ECG device company has embraced IBM Cloud and Watson technologies, to tap the opportunity in the insights-driven remote cardiac health monitoring market.

- **Industry Need:** As per WHO estimates, 7.3 million people die of cardiovascular diseases (CVD), particularly heart attacks and strokes every year globally. For example, heart disease has been the biggest killer in the US since 1920, and involves spending of more than $110 billion/year. However, among all the deaths caused by CVD, about two-thirds of them happen in out-of-hospital settings. This demands robust remote monitoring solutions such as wearables to promote preventive care practices. For example, as per a Mayo Clinic study (2015), digital health intervention among early-stage CVD populations can reduce 40% relative risk and 7.5% absolute risk in CVD events, hospitalizations, and deaths.

HeartBit teams up with IBM on a wearable ECG monitor – June 20, 2018

- **Value Proposition:** HeartBit is a chest strap wearable that measures electrical signals produced by individual's heart with laboratory-like accuracy. HeartBit essentially acts like a 3-lead 5-sensor ECG monitor that can detect signs of arrhythmia, atrial fibrillation and warn you of potential anomalies. As part of this partnership, HeartBit will use BlueMix cloud service to store all customer sessions data. It will also use IBM Watson Data Science to prepare actionable charts and reports for end users.

- As the medical-grade wearables in the cardiac monitoring space get crowded, Frost & Sullivan views the HeartBit' partnership with IBM as a rational strategy to move beyond commoditized device play, and monetize the growing data-based intelligence solutions for future sustainability. However, HeartBit is not the only wearable device OEM that is trying to leverage converging technologies such as big data analytics and AI to provide meaningful health insights. Companies such as Alivecore and QardioCore have already integrated the AI value proposition with their FDA approved wearable ECG/EKG monitors. Despite this Frost & Sullivan believes there is huge growth potential for intelligent solutions that can empower patients with seamless integration of remote monitoring solutions into daily life for early diagnosis and health promotion.

- **Target End-User:** Parents, cardiac rehab centres, telecardiology, clinical trials

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

Mobile Phones/ mHealth

Apple will automatically share emergency locations with 911 dispatchers — June 19, 2018

Applicable Product Categories: Mobile Phones

Technologies	Software Solutions, Sensors, Location Services	**Therapeutic Areas**	Medical emergencies
Applications	Automatic Location Sharing During 911 Call	**Geographic Focus**	USA
Segment Focus	Consumer/Clinical	**Topics (News type)**	Care Delivery Innovation
Companies	Apple, RapidSOS	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Apple plans to release an iOS 12 update allowing all iPhone users who dial 911 to automatically share their location data with first responders
- **Industry Need:** Medical emergency callers often might not be in a position to share exact location details. With increasing use of mobiles to call 911, automatically locating the user based on the mobile GPS and other location data becomes imperative for effective care delivery.
- **Value Proposition:** Apple will use the system built by RapidSOS, called NG911 Clearinghouse, to accurately obtain a mobile caller's location and send it to 911 operators. Apple's HELO (Hybridised Emergency Location) previously estimated a mobile 911 caller's location using cell towers and on-device data sources, such as GPS and Wi-Fi Access Points. RapidSOS's system will deliver the emergency location data of iOS 12 users by integrating with 911 centres' existing software.
- The system covers the privacy aspect by enabling only the responding 911 center to privately access the location of caller—and that's the only information they can retrieve from a user's iPhone. The end-to-end encryption of the communication restricts location access of user's iPhone once call is completed.
- Frost & Sullivan believes that emergency response and medical services are in chronic need for innovation. Automation of basic steps such as location sharing will enhance emergency response times and location accuracy, enabling faster care delivery.

WEBLINK: https://bit.ly/2McvBv2

Apple Transforms iPhone into clinical-grade tool with ResearchKit 2.0 updates — June 19, 2018 (1/2)

Applicable Product Categories: Mobile Phones

Technologies	Software Solutions, Sensors, AI, Machine Learning	**Therapeutic Areas**	All
Applications	Data collection through speech, hearing and vision tests	**Geographic Focus**	USA
Segment Focus	Clinical / Consumer	**Topics (News type)**	Competitive Intelligence; Tech Innovation
Companies	Apple	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Apple's ResearchKit, an open source framework that allows developers to create apps specifically designed for medical research studies, recently launched an update, ResearchKit 2.0, to include features that can collect data from speech, hearing, and vision tests.
- **Industry Need:** Clinical trials and validations are lengthy and expensive processes, which are further plagued by poor trial participation, questionable validity due to data insufficiency and high failure rates. Clinical researchers and patient search firms are increasingly piloting novel data collection approaches and digital endpoints being offered by ResearchKit, for targeted clinical validation studies and they expect this to become the standard in future, considering the benefits and efficiencies associated with remote patient research.
- **Value Proposition:** The new version of ResearchKit includes features that can collect data from speech, hearing, and vision tests. The latest updates are a part of Apple's efforts to turn the iPhone and Apple Watch into invaluable devices for the medical community.

Apple Transforms iPhone into clinical-grade tool with ResearchKit 2.0 updates — June 19, 2018 (2/2)

In addition to some user interface improvements, ResearchKit 2.0 includes new tasks and features enabling researchers to effectively collect additional types of information leading to more insightful results. Some of those new features include -

- **PDF Viewer:** To enable users to quickly navigate, annotate, search and share PDF documents. This will make filling out forms easier, particularly for older iOS users who are most likely to participate in ResearchKit studies.
- **Speech Recognition:** AI-assisted speech recognition feature that can transcribe users' speech into text and allow editing if necessary.
- **Speech in Noise:** Features to gauge participant's speech and hearing health by having participants listen to a recording that incorporates ambient background noise as well as a phrase, and then asking users to repeat the phrase.
- **dBHL Tone Audiometry:** A task that uses the Hughson Westlake method for determining the hearing threshold level of a user in the dB HL scale.
- **Environmental SPL Meter:** A task that enables developers to record users' current background noise levels during active tasks and set thresholds to ensure users are in the proper environment before completing other tasks.
- **Amsler Grid:** A feature to check user's each eye's vision, one at a time, and mark any perceived distortions on the grid displayed on the phone

- Frost & Sullivan believes that open-source mobile software platforms like ResearchKit have the potential for both significant patient engagement as well as data connectivity that could improve the way medical data is gathered, managed and analyzed for clinical validation studies as well as drug trials. Additionally, offering incremental benefits to the existing framework of data gathering and harvesting enabled by automated features such as speech recognition, dBHL tone audiometry, hearing and vision health evaluation, etc. would further reduce barriers for participants by adapting the design of clinical trials to suit their daily routine, leading to a more nuanced understanding of the disease being tested and potentially higher success rates in medical studies. However, experts feel that ResearchKit is far from being medically useful as most ResearchKit apps have yet to support basic study components like managing study visits, connecting with clinical data, creating unique experiences across randomized study arms, issuing treatments and interventions – things that few, if any, ResearchKit-supported studies have yet to attempt.

- **Target End-User:** Patients, clinical trial participants, research and clinical trials sponsors

WEBLINK: https://bit.ly/2KaKu00

Smart Home Devices & Appliances

Q&A: Where is the smart home heading? (1/2) – June 16, 2018

Applicable Product Categories: Smart Home Services

Technologies	Artificial Intelligence, User Interfaces	**Therapeutic Areas**	NA
Applications	Software Solutions	**Geographic Focus**	US / Global
Segment Focus	Consumer Grade	**Topics (News type)**	Tech Innovation
Companies	Brilliant	**Others**	Amazon, Lennar

ANALYST TAKE:

- **Synopsis:** Beyond voice, Brilliant employs other approaches to smart home control – 'ambient computing' using voice, touch and motion.
- **Industry Need:** Voice interactivity has some limitations, as developers are already realizing. For example, interactivity through voice isn't ideal for reviewing information or picking from several options. Such scenarios may often arise even in the healthcare context. Smart assistants like Google Home are only now releasing updates to enable these virtual assistants to process three commands in one go – essentially, you need to speak twice to give separate commands – not an ideal situation for an elderly person or one recovering from health conditions. The need is therefore for, integration of voice, visual and touch interfaces, something not currently offered by the voice-only solutions. Smartphones / tablets do offer this option, but may not necessarily be ideal for use – users need to have access to these at all times.

Q&A: Where is the smart home heading? (2/2) – June 16, 2018

- **Value Proposition:** Brilliant's smart home control product replaces existing switches with voice and touch controls for lights, climate control, music, locks, doorbells, and more. Amazon Alexa is built in, allowing for additional benefits coming through the use of virtual assistants –weather, news, music, etc., without requiring to purchase the Echo device.
  While the solution set is currently not relevant to healthcare directly (except for aging-in-place scenarios or for assisting physically disabled for independent living), Frost & Sullivan believes these are two trends that the entire smart home / home digital health solutions will follow – a) multi – interface control, and b) integration of consumer and health functions. For example, companion robots already have voice interactivity, and some also feature tablets (touch interface integration). The voice functions on existing companion robot solutions, touch interface on some other digital health solutions are not as sophisticated as they can be. Motion control may not be necessary in healthcare, except in niche applications. But at the same time, patients are consumers, and cannot be expected to have different devices for home control, and different devices for health management. Hence, the requirement for a single platform in the smart home is critical to achieve wide spread adoption of solutions.

- **Target End-User:** Smart home device and services users.

WEBLINK: https://bit.ly/2K3Yo7o

China’s national champion in voice-recognition tech is moving into hardware in a big way – June 18, 2018

Applicable Product Categories: Smart Home Devices

Technologies	Sensors, Smart Devices	**Therapeutic Areas**	NA
Applications	IoT	**Geographic Focus**	China
Segment Focus	Consumer Grade	**Topics (News type)**	Competitive Intelligence
Companies	iFlytek	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Chinese AI virtual assistant firm iFlytek has collaborated with three major telecom operators to bring voice-interactive smart devices to the market, including smart speakers, earphones and companion robots .
- Frost & Sullivan believes that smart home devices, even those designed for healthcare, can take advantage of the large customer based afforded by telecommunication companies, which offer broadband services that are a critical need for such devices. Such collaborations often result in a win-win, where the telecom companies can provide a value-added service to their consumers, and often smaller companies such as iFlytek can leverage their large customer base to enjoy increased adoption of products and services. China, being a highly competitive consumer market, requires companies to pursue such business models to scale up.

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

AARP, startups partner to study digital healthcare technology (1/2) – June 19, 2018

Applicable Product Categories: Smart Home Devices

Technologies	Artificial Intelligence, Sensors, Robots	**Therapeutic Areas**	Diabetes
Applications	mHealth apps – Medication Adherence	**Geographic Focus**	US / Global
Segment Focus	Consumer Grade	**Topics (News type)**	Tech Innovation
Companies	American Association of Retired Persons (AARP)	**Others**	Pillo Health, Orbita

ANALYST TAKE:

- **Synopsis:** AARP partnered with Pillo Health & Orbita to provide voice-interactivity, health-focused robotic companions in the homes of selected seniors.
- **Industry Need:** Medication adherence is a major challenge in the US – about 125,000 premature deaths are attributed to it, along with $100 billion - $300 billion (3-10% of total US healthcare expenditure) of avoidable costs. Diseases like diabetes are significant in this regard, especially because non-adherence to treatment may not have immediate effects, but over the long-term high blood sugar can cause damage to internal organs, deteriorating overall health quality. AARP conducted a survey to find 90% of adults aged 50 and over used technology to stay connected, paving the way for helping design a solution.

AARP, startups partner to study digital healthcare technology (2/2) – June 19, 2018

- **Value Proposition:** Pillo, a companion robot by the startup of the same name, will be placed in the homes of 6-10 selected, newly diagnosed (diabetes) individuals for four weeks to study if it can help improve disease management. Pillo has video capability, a touchscreen tablet and facial recognition ability, and is powered by Orbita's technology that enables voice interactivity. Pillo can "dispense medication, connect to caregivers, issue voice reminders and perform daily tasks, like reporting the weather and playing radio stations". The robot can alert caregivers if medication has not been taken by the patients.
- Frost & Sullivan notes that Pillo robot is part of a trend exploring the use of robots for medication adherence and also to end isolation issues for independent seniors. Other examples include the Mabu robot and the ElliQ robot. While concrete evidence from scientific, peer reviewed studies using companion robots for several elderly care issues that they can be used for, do not necessarily exist, the potential of this technology to make an impact on elder care cannot be discounted. In fact, several futurists in the healthcare space, as outlined even in Frost & Sullivan's Vision 2025: Future of Healthcare, believe robots to be used for a variety of applications in healthcare, including the role they can play to give independent seniors company. The fact that AARP is now taking upon itself the task of studying the impact of digital health technologies is encouraging for this space, as well as the smart home for healthcare concept in general.

- **Target End-User:** Elderly population, aging-in-place seniors.

WEBLINK: https://bit.ly/2Kb2pXP