FROST & SULLIVAN

Healthcare Market Updates

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Wearables

Qualcomm smartwatch chip may include eye-tracking support for AR glasses (1/2) – May 15, 2018

Applicable Product Categories: Wearable

Technologies	Smartwatch, Smart glass (chip/processor technology)	**Therapeutic Areas**	All
Applications	Energy-intensive fitness features, such as GPS and heart-rate monitors	**Geographic Focus**	Global
Segment Focus	Clinical/Medical Grade	**Topics (News type)**	Technology advancement
Companies	Qualcomm	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Lack of innovation and differentiation has increased the commoditization trend in the wearables space. To stay competitive, Qualcomm, one of the leading chip makers for wearable devices, is reported to be working on a new processor platform for wearable devices, replacing the aging Snapdragon 2100 chip that powers the majority of smartwatches today. Qualcomm is expected to release the new version of its smartwatch chipset called Qualcomm 3100 soon. The next-generation smartwatch chipset from Qualcomm will be built from the ground up with a focus on smartwatches to ensure an optimal experience for smartwatch users.
- **Industry Need:** Despite the innovation around biosensors to ensure accuracy for wearable health monitors, seamlessness and battery life have been on going issues hindering the progress into broader applications for the healthcare space.

Qualcomm smartwatch chip may include eye-tracking support for AR glasses (2/2) – May 15, 2018

- **Value Proposition:** Recognizing these critical needs, Qualcomm promises that the new processor platform will be smaller compared to Snapdragon 2100 and would allow smartwatch makers to make better use of space. The new processor platform is also expected to come with a longer battery life as the transition to smaller manufacturing processes should lead to a reduction in energy consumption. This can be seen as a direct competition to players such as Samsung's Gear smartwatches (powered by Tizen) which currently offers significantly better battery life than most of its Wear OS competition due to its superior SoC (system on chip). These additional features with upcoming Qualcomm 3100 processor are expected to enable smartwatch OEMs to integrate more energy-intensive fitness features, such as GPS and heart-rate monitors for much needed healthcare applications. Additionally, Snapdragon 3100 could reportedly be used for all wearable devices including Google's next generation augmented reality glasses. If Qualcomm manages to walk the talk on Snapdragon 3100 promises, it will create a serious concern for competing chip makers in the wearable space.

- **Target End-User:** Health Wearable OEMs (e.g. Smartwatch and smart glasses)

WEBLINK: https://bit.ly/2IuIcZ3; https://bit.ly/2LawynX

LifePlus claims to have first non-invasive continuous glucose monitoring wearable (1/2) – May 17, 2018

Applicable Product Categories: Wearable

Technologies	Wearable (Software); AI	**Therapeutic Areas**	Diabetes
Applications	Non-invasive continuous glucose monitoring	**Geographic Focus**	USA
Segment Focus	Consumer + Clinical/Medical Grade	**Topics (News type)**	Technology advancement
Companies	LifePlus	**Others**	NA

ANALYST TAKE:

- **Synopsis:** LifePlus, a start-up that recently came out of stealth mode, revealed its non-invasive continuous blood glucose monitoring multi-sensor wearable, called LifeLeaf. The company has plans to release the LifeLeaf wearable device later this year, in limited quantities. However, commercializing Lifeleaf as a medical-grade wearable still depends on the approval by regulatory authorities (FDA/EMA) post successful completion and submission of the on-going clinical trials data across five cities around the world by LifePlus.

- **Industry Need:** Non-invasive glucose monitoring device remains a billion dollar R&D black hole for the healthcare industry. In the last 3 decades, more than 1,600 patent families were filed for non-invasive glucose monitoring by 500+ applicants. Despite this none of these companies have managed to get the regulatory approval to replace the conventional and painful method of finger pricking deemed as the current gold standard for measuring blood glucose.

LifePlus claims to have first non-invasive continuous glucose monitoring wearable (2/2) – May 17, 2018

- **Value Proposition:** Unlike a majority of the wearables that follow a device play, Lifeleaf wearable is more of a reference device with its core differential value proposition at the software layer. As per the company, the innovation is not at the sensor/device layer but has more to do with its unique approach to use light from existing sensors to better isolate glucose in the blood. Then, it takes that isolated data and applies machine learning to spit out tracking metrics. Once the device is vetted clinically and approved by regulatory authorities (FDA/EMA), the company plans to license out its software to other hardware manufacturers, the likes of Garmin or Fossil, to allow them to also non-invasively monitor glucose and other metrics. If Lifeleaf manages to prove the accuracy of its software, it can be the game-changer for millions of diabetes patients who still depend on the painful finger prick method to keep a tab on their blood glucose levels.

- **Target End-User:** Wearable device OEMs, Diabetes Patients, Diabetes management centers, Hospitals and wellness programs.

WEBLINK: https://bit.ly/2rSkqyV, https://bit.ly/2wSk5Sr

Mobile Phones/ mHealth

Smartphone Lab Performs Rapid Medical Testing of 12 Common Viral and Bacterial Diseases — May 8, 2018

Applicable Product Categories: Mobile Phones

Technologies	Artificial Intelligence	**Therapeutic Areas**	Infectious Disease
Applications	Software Solutions; Image Analysis Platform; AI Algorithms	**Geographic Focus**	Global
Segment Focus	Clinical Grade	**Topics (News type)**	Tech Innovation; Care Delivery Innovation
Companies	Washington State University (WSU)	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Researchers at WSU developed a low-cost, portable laboratory-on-a-phone that works nearly as well as clinical laboratories to detect common viral and bacterial infections.
- **Industry Need:** Point of Care Testing (POCT) has been evolving as a preferred diagnostic mode owing to increasing miniaturization, consumerization, and a surge in retail clinics and physician laboratories. Low cost and immediate diagnosis of infectious disease and epidemics becomes all the more important in rural or lower-resource regions. Enhancing smartphone penetrations in such regions further enhance the market potential of such rapid tests.
- **Value Proposition:** The portable microplate reader (mReader) is expected to cost less than $50 to manufacture. The mReader, about the size of a hand, uses AI based image analysis algorithm and pairs with a smartphone, to analyze multiple serology assay wells at a time (96 as opposed to 1) and offers high levels of accuracy (97-99.9%) in diagnosing 12 common viral and bacterial infections. While the technology is not commercialized yet, this developmental solution is an ideal in-licensing or collaboration target for large companies.
- **Target End-User:** Microbiologists; pathologists; clinical and pathology laboratories; hospitals; clinics

WEBLINK: https://ubm.io/2rSI9iq

Beyond Face ID: Apple Patents Technology That Can Scan Under Your Skin — May 17, 2018

Applicable Product Categories: Mobile Phones

Technologies	Sensors, Artificial Intelligence	**Therapeutic Areas**	All
Applications	Data Analytics; Software Solutions	**Geographic Focus**	Global
Segment Focus	Clinical Grade	**Topics (News type)**	Competitive Intelligence, Tech Innovation
Companies	Apple	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Apple has been granted a patent in the US, first filed in 2015, that could lead to huge enhancements in the iPhone's biometric abilities by using "pulsed radiation" to observe users' veins.
- **Industry Need:** While the patent is positioned as a biometric verification tool, the healthcare applications are immense and covers fields such as surgical simulation, real-time vitals monitoring, telemedicine, enhanced surgical efficiency, catheter insertions and IV infusions. Several companies such as AccuVein, Evana Medical have forayed in vein imaging and position themselves into various abovementioned fields.
- **Value Proposition:** The patent called "vein imaging using detection of pulsed radiation" uses iPhone cameras and infrared radiation tech to capture vein structure beneath skin. The patent is currently positioned to further enhance the iPhone's biometric ID and solving the "twin problem" faced by iPhone X.
- **Target End-User:** Surgeons; radiologists; anesthesiologists; care delivery systems

WEBLINK: https://bit.ly/2IuIcZ3

Smart Home Devices & Appliances

Behind the Scenes: Cox Smart Home technologies and services help aging adults stay at home (1/2) – May 11, 2018

Applicable Product Categories: Smart Home Devices

Technologies	Sensors, Smart Appliances
Applications	IoMT
Segment Focus	Consumer
Companies	Cox Communications, Inc.
Therapeutic Areas	Elder / Senior Care
Geographic Focus	United States of America
Topics (News type)	Tech Innovation, Business Model, Care Delivery Innovation
Others	NA

ANALYST TAKE:

- **Synopsis:** Cox Communications, a prominent US cable services, telecommunication and home automation services provider, has demonstrated a smart home for senior living, outfitted with over 50 technologies for eldercare.
- **Industry Need:** Aging-in-place is a growing trend globally, and smart homes provide the right environment to help seniors age independently, but safely.
- **Value Proposition:** Covers technologies included in the model senior smart home. While the coverage does not necessarily cover all unique technologies, the value proposition is centered in making available a host of technologies together in a bundle, catering to elderly care.
    - Joy for All Orange Tabby Cat – model cat purrs and meows; sensors that respond to petting and hugging. Considering that most seniors live alone, a model pet can be a great companion, compared to a real pet which has its own needs that seniors may not be capable of catering to. This seems to be a cheaper option compared to the other products, which are companion robots that serve similar purposes, but with more advanced features and a hefty price tag.

Behind the Scenes: Cox Smart Home technologies and services help aging adults stay at home (2/2) – May 11, 2018

- Big Button Remote & Clarity P300 Landline Phone – Larger buttons (remote and phone), louder, clearer sounds (phone). Conditions like arthritis may make it difficult to operate small button remotes (apart from the visibility issue). The phone also has programmable photo memory buttons, for patients with dementia to dial their frequent contacts easily. Both are just one of the several options available.
- LiveFine Medication Dispenser: 28-days medication sealed; dispensed on programmed schedule. Seniors often have multiple medicines regimen, and find it difficult to remember the schedule. Medication adherence is a major challenge that can affect their health conditions. This product is also one of several available.
- Smart Door Sensors – Equipped doors and windows can detect when they are opened and closed. Seniors may forget to close doors and windows; notifications can help remind them. At the same time, if not opened for a long time, notifications can be sent to loved ones to check on the seniors to ensure their wellbeing. An emerging category of IoT products, there are also smart plugs available to sense if appliances (coffee maker, for example), has been turned on or not, at regular schedules.
- Rendever – A virtual reality platform to visualize locations far beyond the home. Seniors cannot necessarily travel long distances, so virtual reality can help them enjoy the experiences of distant locations , without traveling. This also has therapeutic effects, because it can prove to be a great distraction from any ongoing health conditions they may have. Several meditation / relaxation based VR solutions are available.
- Smart Plug – to schedule on/off, perform remotely. The convenience of not having to get up for switching an appliance or a light on / off, especially for seniors, cannot be overlooked. One of several new entrants in this space.
- HAPIfork – electronic fork to help monitor and track eating habits. Monitoring the data later, can help derive insights on trends in time it takes to complete a meal. Any significant changes can point to health conditions – problems with teeth, digestion, or other areas, that can be brought to the attention of care providers. An innovative and novel product that probably has no parallel yet.
- Trapollo LLC – integrator of remote health monitoring solutions. Regular health-checkups are crucial for seniors. Using home-based monitoring devices and solutions, and telehealth consulting support, these can be conducted without the seniors having to leave home.
- Oral-B Pro 5000 Toothbrush – smart toothbrush to help take care of oral health. Helps seniors know if they have brushed long enough, and in some cases, helps remind if they have brushed at all (dementia).

- **Target End-User:** Elderly folks who wish to stay independently, and adults who live far away from elderly parents and wish to ensure their wellbeing. We can speculate that Cox can enable these technologies (in a modular format), with a subscription model.

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

Here are the ways AI is helping to improve accessibility (1/2) – May 17, 2018

Applicable Product Categories: Smart Home Devices

Technologies	Sensors, Smart Appliances, AI	**Therapeutic Areas**	Physically disabled, cognitive impairment patients (stroke, brain injuries, Parkinson's, Down syndrome, cerebral palsy, etc.)
Applications	Software Solutions	**Geographic Focus**	Global
Segment Focus	Consumer	**Topics (News type)**	Tech Innovation, Care Delivery Innovation, Competitive Intelligence
Companies	Google, Amazon, Microsoft, SalesForce, Voiceitt	**Others**	NA

ANALYST TAKE:

- **Synopsis:** Tech firms and startups are increasingly leveraging AI in building accessible, inclusive products.
- **Industry Need:** A significant advantage of tech advances, including the smart home, have been to provide the much required support and inclusion for those with disabilities, without having been designed for them (acknowledging their dignity). Those with speech, hearing or vision disabilities need products with some tweaks to be better able to use them.
- **Value Proposition:** Designing and developing inclusive solutions for those with disabilities.
    - Smart Home Speakers and Voice Assistants – For blind people, and those with physical ailments, these can control smart home appliances, thermostat, lights, and any other smart products, which can be very useful. Blind people can also use them to search for information online, and help them multi-task. Google Home, Apple HomePod and Amazon Echo are all useful products in this sense. Some DIYers have even managed to create voice controls for motorized wheelchairs.

Here are the ways AI is helping to improve accessibility (2/2) – May 17, 2018

- Speech to text and vice versa – Those with speech impediments can find it difficult to use voice solutions. Voiceitt is an app designed for such people (recovering from stroke, brain injuries, cerebral palsy, Parkinson's, Down syndrome, etc.) which uses AI to learn speaker's pronunciations over time and normalizing those. Similarly, Google's AI focused division, DeepMind, is helping create closed captions for the deaf, which are proving to be better than professional lip-readers in some tests. These applications are novel, and probably better than available alternatives in the market today. Besides, these can promote more inclusion, providing access for the disabled, to the same content and features as everyone else.
- Automatic Image Recognition – Google's Cloud Vision API can classify photographs, while Microsoft's Seeing API can read handwritten text, describe colors and scenes. The resources and power that these tech giants wield, makes it possible for them to invest in, and develop such solutions, which no one else seems to be currently investing in.
- Abstract summarization – Those with attention deficit disorders and low literacy skills can be helped by summarizing large pieces of text (news, emails, documents) in to smaller paragraphs or single lines. Google Brain and SalesForce have been active in this area.

- **Target End-User:** Those with disabilities mentioned earlier, for use in smart homes (through smart speakers and voice assistants) or at worksites / offices to help the disabled be more productive.

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