MHEALTH WEARABLES DATA USAGE, ACCURACY AND FUTURE ADVANCEMENT

by

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A gray area in the mHealth space is ownership of the overwhelming amount of data being collected from devices.

The market for mHealth wearable devices (web-connected technologies) is exploding, with Statista projecting that 601 million connected wearable devices will be in use by 2020, up from 97 million in 2015. Juniper Research projects the space will generate $53.2 billion in revenue by 2019, with the number of fitness devices alone tripling from an estimated 19 million in 2014.

The general consensus is that web-connected technology that enables better personal health and wellness will be widely adopted globally. Companies such as Apple, Google, Samsung and Qualcomm also have entered the space and are building quantified self platforms that can serve as central repositories for individual health and wellness metrics and will enable consumers to easily and effectively manage and analyze the data coming from a wide range of mHealth devices and applications.

While web-connected technologies are attracting attention from the healthcare industry and consumers, they also raise many questions and concerns. Will the devices be prescribed by physicians or purchased freely in any retail store? How are mHealth data collected, shared and used? Are the data accurate and reliable? Can we regard wearable data as medical grade data? The answers to these questions will inform the development of a new generation of wearables and determine their fate.

These web-connected devices and applications, which transmit health data to the cloud, also enable a future in which healthcare professionals will have easy access to relevant patient health data. This could help an actively engaged physician adjust medication dosages, suggest lifestyle changes, or intervene as necessary if any danger signs are apparent in the incoming biometric data.

Ownership and Use of mHealth Data

A gray area in the mHealth space is ownership of the overwhelming amount of data being collected from devices. Logically, many likely think consumers themselves have complete control over the data on their devices. However, consumers agree to have their data shared with a number of parties via their devices’ privacy policies, terms and conditions, and user agreements, and their data are automatically uploaded to the cloud, where sharing is made easy. Whether or not consumers are aware, manufacturers are collecting data from the devices they have sold.

Wearables such as Fitbit or Apple do not declare ownership on users’ personal data, but they do claim certain rights. Data are used for providing the service, for research informing health community trends, and for marketing and promotion. Information will not be sold but will be “shared.” Many of these terms are open for interpretation.

Manufacturers’ collecting certain data is highly beneficial to the consumer. Manufacturers must meet their responsibility as marketing authorization holders (MAH), which requires manufacturers to monitor products for safety as long as they are on the market. In general, all manufacturers want to continuously improve their products. Collecting user data allows manufacturers to produce newer, better versions ahead of their competition. In addition, many apps are available for free, and using data for activities such as targeted advertising helps keep them that way. By using predictive models, manufacturers can validate devices’ accuracy and create algorithms to show users how healthy they are.
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compared with the norm. As such, we should not assume that a manufacturer’s collection of personal data is to the detriment or somehow taking advantage of the consumer.

are the data collected from wearables accurate?

any healthcare data used for prevention, diagnosis, and treatment require the highest possible accuracy and absolute scientific measures on data collection, management and analysis. To win acceptance in the market, companies that manufacture wearable devices will need to prove through extensive studies that they can accurately monitor and hopefully improve patient health.

manufacturers will need accurate readings to tease out known signals, like fluctuations in glucose levels or abnormal heart rhythms such as atrial fibrillation. machine learning technologies also will make it possible to discover “unknown signals,” such as the significance of skin conductance for a variety of conditions. all of these depend on the accuracy of the data collected. users across several states have already claimed that some of these products are collecting inaccurate data and their marketing programs are misleading, causing them to file class-action lawsuits against manufacturers like fitbit.

healthcare providers have been slow to embrace consumer-facing wearables like fitbits, jawbones and apple watches because they do not trust the accuracy of the information (or cannot find a way to use it). instead, they’re using more expensive medical-grade devices for remote patient monitoring programs, which ensure data validity but often drive up the cost of the program, making it less sustainable.

a wearable device accuracy study conducted by patel had 14 people walk 500 and 1,500 steps on a treadmill and then compared the results on each device; the study showed a variation in device accuracy by as much as 23%, and similar small-scale studies from case et al. and dennison et al. on the accuracy of smartphone applications and wearable devices for tracking physical activity data showed mixed results. many smartphone applications and wearable devices were somewhat accurate for tracking step counts, but the wearable devices observed had more variations. the differences were both higher and lower, and one device reported step counts more than 20% lower than observed. step counts are often used to derive other measures of physical activity, such as distance walked or calories burned. underlying differences in device accuracy may be compounded in these measures. there have been few evaluations with large samples on the accuracy of their use for a wider scope.

efforts are being made to allay such concerns. for example, in february 2016, philips announced plans to develop its own line of medical-grade biosensors, starting with patients in low-acuity settings (low severity or require low intensity of care) in the hospital but eventually transitioning to patients on home monitoring programs. companies like validic, meanwhile, are developing mhealth platforms that facilitate the data taken from wearables for providers.
Reliability of wearables is still being developed and tested on a large sample, cross-brand studies. All constituents, including manufacturers, regulators, payers, healthcare professionals, and consumers, will welcome improvement.  

**FUTURE OF mHEALTH WEARABLE DATA ADVANCEMENT**

The overwhelming popularity of mHealth wearable devices is irreversible. But the future of such products depends on sorting out the two issues above: data accuracy and permitted uses. It is forcing advancement on this innovation to make wearables generate clinical-grade data using better sensors and more sophisticated algorithms, network platforms, and infrastructure.

Consumer-focused companies, including Apple, Google and Samsung, have all begun to develop ways to bring consumer activity data into patient management. Meanwhile, established medical equipment players, such as Philips Healthcare and GE Healthcare, have recently launched their own mHealth platform plays.  

Connectivity can be the sticking point of the advancement of mHealth wearables. Patients can have greater access to vital data about their own bodies and be more involved in their overall health and wellness. How information is shared and protection of privacy will influence how doctors and patients share information, interact and make decisions about patient care.

If data collected from non-invasive mHealth wearables is accurate enough for clinical use, it will soon replace data that currently is only available through the use of expensive, invasive and hard-to-access equipment, which is a huge benefit for healthcare system as a whole as it can be regarded as the next generation of non-invasive body monitoring solutions.

We are at the beginning of this exciting technology revolution, and it is certain that mHealth wearable data will become more accurate, cleaner, and faster in synchronizing with other devices.
REFERENCES

1. https://www.fitbit.com/uk/privacy
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Dr. Jessica Santos is the Global Compliance and Quality Director at Kantar Health, the largest custom market research company focused on the life sciences industry. She is primarily responsible for providing oversight and support across the 40+ Kantar Health global offices in the areas of regulation, interaction with clients, suppliers and others within Kantar Health, Kantar and WPP. Dr. Santos is responsible for maintaining, anticipating and coordinating all activities with regard to compliance laws/regulations, industry guidelines, pharmacovigilance and client contracts, defining and driving the execution of Kantar Health’s Quality Strategy – our approach to measuring and improving our quality efforts.

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