



Enhancing Clinical Practice with Wearables

Innovations and Implications

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Overview

Wearable devices—smart glasses, wrist-worn displays, biometric authentication bands and all manner of smart connected devices intended to be worn on the body—have many promising applications in healthcare settings. (For more information, see the Accenture Healthcare Technology Vision 2015 and accompanying Top 5 eHealth Trends infographic.)

When integrated with core medical systems, wearables can enable physicians, nurses and hospital staff to become truly mobile, using their hands to work while having access to relevant, context-aware information. The result? Faster, higher quality decision making, more efficient work output and lower costs.

Leading-edge hospitals and clinics are already using wearable technologies to transform resident training and emergency medicine communication,¹ providing a critical advantage in today's competitive healthcare market. The opportunity continues to expand. According to Soreon Research, the wearable healthcare market is estimated to save up to 1.3 million lives and grow to \$41 billion by 2020.²

What's more, patients are ready for wearables. Evidence from the Patient Engagement Survey shows 49 percent of patients globally wear or would be willing to wear technology that measures and tracks both fitness/lifestyle and vital signs.³

Our Accenture Doctor's Survey shows that healthcare administrators can leverage wearables to achieve greater cost savings and operational efficiencies. Sixty-two percent of physicians say patients' use of wearables contribute to accuracy of records and 36 percent say wearables help with reduction in cost.⁴

In order to seize these benefits, healthcare organizations must proactively address some unique wearables implementation challenges that span the regulatory, technical, security and operational areas. This point of view provides some key considerations that will help guide the way.



Improving hospital and clinical operations with wearables

Imagine physicians using smart glasses to access patients' electronic medical records while performing examinations. The doctors could engage directly with their patients and make quicker, more accurate diagnoses by reviewing relevant medical histories at the same time. Imagine nurses wearing smart glasses or wrist-worn displays to receive information during their shifts. While tending to patients, a nurse could know with a quick glance that a patient is prepped to be taken to the surgery ward, or that another patient would appreciate an extra blanket. And imagine custodians using wearables to receive alerts on which hospital rooms are ready to be cleaned. They could respond much more efficiently, increasing daily room turnover rate by a noticeable percentage.

These innovative scenarios are within reach. Leading healthcare organizations are already capturing the opportunities that wearables offer for critical procedures, medical training and monitoring. The Stanford Medical School conducted a study that compared students using Google Glass™ while operating on dummies and students doing the exercise using traditional means. Those using Google Glass did markedly better—improving recognition of certain key indicators 10 times faster, while reducing reliance on traditional monitors by nearly 90 percent.⁵

Positive impact of wearables

By deploying wearables technologies, hospitals and clinics can achieve benefits across multiple levels and roles. Here are some opportunities:

Improve patient care and satisfaction

Provide surgeons and physicians with critical information to improve decision making process while increasing opportunities for patient connection. Examples include using smart glasses to view patient vitals and relevant information during surgical procedures without taking eyes off patient; accessing electronic medical records and dosing guides while conducting physical exams; or interacting and engaging directly with patient without having to refer to laptop or tablet screen.

Enhance operations at point of care

Enable more efficient and effective use of nurses' time and resources. Examples include using smart glasses or wrist-worn displays to instantly alert nurses to specific patient needs or to update patient location in the hospital (i.e., moved into operating room); optimizing nurse assignments to attend to patients in a smart way; or providing supplemental patient vitals monitoring.

Strengthen operational bottom line

Facilitate cost savings by equipping building and custodial staff with wearable devices that increase productivity. Examples include directing upcoming tasks based on skillset or location, and providing alerts when a room is ready to be turned over or an area needs to be cleaned.

Integrating wearables in a healthcare setting

Implementing wearables in hospitals and clinics requires careful planning across four key areas: regulatory, technical, security and operational. To move ahead, healthcare organizations must proactively address the relevant regulations, then implement the proper technology systems and security protocols to make their wearables implementation fully compliant and operational.

Regulatory

In the United States, the US Food and Drug Administration (FDA) has taken a risk-based approach to wearable and mobile health technologies, committing to enforce regulations on only high-risk health IT applications and clinical devices.⁶ In October 2014, the FDA issued draft guidance recommending that device manufacturers manage cybersecurity risks in the initial design and development process for network-connected medical wearables that access patient data.⁷ In February 2015, the FDA defined additional classes of devices such as "mobile medical applications" and "medical device data systems," and released new information on the regulatory applicability and requirements on these devices.⁸ With these decisions, the FDA has placed the primary responsibility for regulatory compliance in the hands of device manufacturers, not hospital and clinical administrators.

In addition, the government, device makers and healthcare organizations are establishing wearables regulations for the Health Insurance Portability and Accountability Act (HIPAA). According to an interview in FierceHealthIT, since HIPAA "is a sectoral law that covers specific context of information use, not a data protection law, it only regulates medical data when it is in the hands of, within the control of, or within the purview of a medical provider, a health plan or covered entity under the law."⁹

At this point, consumer wearables that track steps, heart rate and sleep patterns are not considered to be protected personal health information (PHI) and, therefore, are not subject to HIPAA. However, TrueVault, a company that specializes in HIPAA compliance for healthcare applications, reports: "If the data is transferred in any way to a medical professional, including hospitals, doctors and third-party companies in the course of providing a healthcare service, such as a diagnosis or treatment, then it automatically is covered by HIPAA because it is then considered a part of the patient's health records."¹⁰ A few wearables manufacturers are making this easier by designing smart glasses and wrist-worn displays specifically for the medical field. For example, Pristine makes EyeSight, a HIPAA-compliant video communications solution for Google Glass for healthcare providers.

HIPAA further stipulates that any type of technology or device that can connect to a wireless network, record, store and transmit PHI with covered entities must be compliant. Hospital and clinical administrators implementing wearables that include patient monitoring must heed this law. Presumably wearables will also be subject to the HIPAA-related Health Information Technology for Economic and Clinical Health (HITECH) Act, with similar formal reporting requirements if personal health information is breached.¹¹

To meet regulatory guidelines, hospitals and clinics must establish stringent wearables use policies, provide education to all caregivers and staff members, and make sure they know how to report breaches.

Technical

Interoperability is a key consideration for wearables implementations in healthcare organizations. Wearable devices either serve as an interface to a data warehouse (e.g., a smart watch pulling data from the cloud to be displayed on the screen) or as a device generating data to be stored in a data warehouse (e.g., updating a patient record). In either case, the selected wearable devices and associated platforms will need to communicate and interact with the data source, such as electronic medical records systems, diagnostic and monitoring systems, billing systems, data capturing and tracking systems or another medical data-generating device. Hospitals and clinics will need to make sure components work together to create a more efficient, streamlined experience for physicians, nurses, staff members, patients and their families.

Apple (with HealthKit) and Google (with Fit) have both entered this market to provide an intermediate layer, which can serve as the bridge between devices and data sources. This space continues to shift, however, as new vendors enter the market to provide interfaces between devices and medical records systems. Healthcare administrators will need to consider which platform their wearables implementation is tied to. In addition, they will need to be aware of emerging standards that dictate how communication layers should be built and how the system should be architected.¹²

In terms of the data being transferred and accessed via wearables devices, hospitals and clinics will want to establish a comprehensive data management and governance policy that promotes the thoughtful use of this data, while preventing abuse. Depending on the implementation, they will also need to decide how to handle the influx of new data. Without context, these data stores could overwhelm a clinical decision maker.

Scalability is yet another factor, especially as the Internet of Things (IoT)—the universe of intelligent products, processes and services that communicate with each other and with people over a global network—becomes a reality. As hospitals and clinics add wearables to their wireless networks, it may challenge network capacity and reliability. Multiple devices connected and actively transmitting to a single wireless network at a given time could overload the system. Depending on the wearables use case, hospitals/clinics and IT departments will need to ensure their network architectures can handle the increased demand of supporting life-critical devices while also providing Internet access to patients.

Security

The largest security risk with the wearables form factor comes from their ability to store and transfer data.¹³ For example, Google Glass and some smart watches contain microphones and the ability to record video. This unstructured data could possibly be subjected to unauthorized access, duplication or loss. If breached, it could also be a violation of a patient's privacy. (For more information, read "[Are Your Wearables Safe from Cybersecurity Threats?](#)" and "[How to Protect Your Wearables Implementation](#)" a two-part blog post from Accenture Technology Labs.)

Depending on the intended purpose and use for the wearable devices, hospitals and clinics should implement specific security policies and procedures. For instance, if the intended device use case involves accessing highly confidential patient test results, implementing multi-factor authentication via a passcode or pin could effectively reduce security risk.

To adhere to HIPAA standards, it will be important to use varying data encryption levels based on the data being accessed or transferred. Administrators will also need to develop policies and impose controls to dictate what information will be accessible from those devices, by whom and under what circumstances. For instance, restricted patient medical information would require a higher level of encryption than unrestricted information, which may be accessed by custodial service personnel.

Finally, since wearables are both unobtrusive and highly portable, it is easier to gather information from virtually any location within a hospital or clinic. Limiting physical parameters to maintain

security may be necessary. Some types of wearables function as an advanced identity badge, and can be used as access-control mechanisms for approved staff members based on their unique heartbeats. Another option is a geofence, a virtual barrier that triggers an alert or disables a device when it enters or exits defined boundaries. For a final layer of physical security, shielding or jammers could be strategically placed to block signals within highly secure locations. This would limit smart glasses from transmitting video data in areas that are not relevant to the job or in off-limits locations such as the cafeteria or restrooms.

Operational

Hospitals and clinics will need to develop a strategy to roll out and maintain the processes supported by wearable technologies. This includes determining how to implement the technology from a logistical standpoint, provide appropriate training to employees, and maintain regulatory compliance and data privacy on an ongoing basis. Like other processes that healthcare organizations must manage, it will be essential to establish goals, communicate expectations, follow effective change management practices and commit to continual improvement.

In order to protect patient safety, the FDA is in the process of establishing a unique device identification (UDI) system to track the distribution and use of medical devices.¹⁴ This will most likely include wearables used in a healthcare setting. This system will impact enterprise device management and specifically how hospitals and clinics distribute wearable technologies to physicians, nurses and other employees who could potentially access patient data.



Accenture Advances Wearables in Healthcare

To help expedite the wearables implementation, hospitals and clinics should consider working with an external provider that offers deep healthcare industry experience, a track record helping clients adopt HIPAA-compliant technology into patient care processes, and a perspective on the unique functionality and form factor that wearables offer. Accenture's experience includes:

Philips for Google Glass at Beth Israel Deaconess

Koninklijke Philips N.V., a global leader in medical testing and patient monitors, requested a workshop on ways to integrate its healthcare software with an early-stage Google Glass device and use it in existing processes. Accenture helped validate the technical feasibility, and then built a demonstration to illustrate how Google Glass can be used in the operating room. For example, surgeons can check the display to get updates on a patient's vital signs while still looking directly at the patient.

Salesforce Wear app

Accenture conducted a live demonstration of a Salesforce Wear app designed to show how wearables can benefit hospitals in multiple non-life saving ways beyond the surgery room. For example, patients equipped with smart watches could more easily communicate specific needs to the nurses' station and get a quicker response. Nurses could use the wearables to more easily monitor a number of assigned patients while helping a specific one; update patient records to more quickly communicate a patient's status to family members (i.e., send a message to smart phone that a patient is done with surgery); or alert janitors that a patient has checked out and a room is ready for cleaning.

Wearables with Emotiv Insight Brainware for ALS Patients

To provide more independence to patients with amyotrophic lateral sclerosis (ALS) and other neurodegenerative diseases, Accenture Technology Labs collaborated with Philips Digital Accelerator Lab to create proof of concept software that connects a wearable display to Emotiv Insight Brainware. The Emotiv technology scans EEG brainwaves to detect, in real-time, their thoughts, feelings and expressions. This enables patients to issue brain commands to control Philips' products, including a medical alert service, a smart television and a personal wireless lighting platform.¹⁵

Conclusion

In the quest to improve healthcare delivery and patient outcomes, wearables stand out as a groundbreaking technology that can provide hospitals and clinics with a strong competitive advantage. To get started, administrators should determine the most beneficial use cases for wearables in their hospital or clinical setting; and address the regulatory, technical, security and operational areas to maximize the implementation. Conducting pilot projects and iterating rapidly will help bring the best wearables solutions to physicians, nurses and staff members, making it possible for them to access relevant data, make quicker decisions and increase productivity—all while performing their hands-free work.

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Contact us

Brent R. Blum

Wearable Technology

Practice Lead

brent.r.blum@accenture.com

Frances Dare

Healthcare

frances.dare@accenture.com

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Contributors

Sonia Garcia, Obaid Sarvana