



Office of Technology Strategies (TS), Architecture, Strategy & Design (ASD)

A VA Executive's Guide to Integration of Fitness Devices into Healthcare

INTRODUCTION

This CTS Note examines the integration of mobile fitness devices and the patient-generated data (PGD) they produce into the framework of healthcare systems. It describes how the integration of this technology is a necessary component to providing seamless services and information on any device, anywhere, anytime. The proliferation of smartphones, remote monitoring devices, application development platforms and ubiquitous networks is enabling massive growth of PGD as well as the number of adults who have a health application running on that device. In this note we will provide an

introduction to fitness devices and PGD available today, technologies involved in integrating fitness devices into healthcare, and how these fitness devices are an important component of enabling the Department of Veterans Affairs (VA) IT Vision of device freedom for Veterans.

BACKGROUND

The last decade has witnessed a surge of interest in the integration of fitness device PGD into healthcare systems. According to the American Medical Informatics Association, "within five years, the majority of clinically relevant data will be collected outside of clinical settings."

Great strides have been made in the development of wearable technology devices and applications for fitness, healthcare and wellness monitoring. The use of fitness device technology to create, store and share health-related activity data in patient/provider communications encourages patients to take a proactive role in the generation of their healthcare data and creates new opportunities for care. As part of VA's IT Vision, integration of fitness devices into healthcare, that may or may not be hardwired into VA's network, would provide the Veteran flexibility to share their lifestyle and activity data.

FITNESS DEVICE PGD

The growing adoption of fitness devices must lead us to consider their ability to inform healthcare systems. Fitness devices allow you to track everyday activities like

This newly established office within OI&T's Architecture, Strategy & Design (ASD) interacts not only with the ASD pillar offices, but also with multiple stakeholders within OI&T and with strategic offices across the enterprise. TS works closely with IT and business owners to capture business rules and provide technical guidance as it relates to Data Sharing across the enterprise, specifically for interagency operability.

steps, distance, calories, active time, dietary choices, weight, and sleeping habits/quality and can continuously send those statistics to a computer or mobile device. PGD from fitness devices is created, recorded, and gathered by people for the purpose of wellness monitoring and to help address health patterns and concerns. Included in the figure is a growing list of fitness device product categories and PGD produced from those devices.

FITNESS DEVICE INTEGRATION AND TECHNOLOGIES

Healthcare providers currently see snapshots of data specific to the records they have for their patients that may or may not accurately reflect their true status. The patient-clinician relationship is limited to the data exchange that happens within the confines of the clinician's office. The clinician's prognosis and prescription is limited to this "snapshot" of the patient's lifestyle, activity, trending symptoms, etc. Fitness devices enable patients and clinicians to have a holistic, complete and accurate timeline of a patient's life to better understand symp-

Product Categories	Types of PGD
<ul style="list-style-type: none"> Activity Monitors Sleep Sensors Emotional Measurement Smart Glasses Fitness & Heart Rate Monitors Smart Clothing Foot Pods & Pedometers Smart Watches Heads-up Displays Audio Earbuds 	<ul style="list-style-type: none"> Steps per day Calories burned Active minutes Weight Posture Glucose Blood pressure Heart rate Distance Time Strength Cardio endurance Weight lifted Weight distribution and motion Water consumed Diet Speed/ Acceleration Movement/ Breathing Sleep quality

Figure: Fitness Device Categories and the Patient Generated Data they can collect

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toms and make prognoses. With the adoption of fitness devices, people are able to rely on the continuous, passive recording of activity data versus relying on their memory. This takes the stress off patients when trying to provide accurate responses to their provider and improves communication. Additionally, the adoption of this technology in the healthcare system will further the case for medical data integration. Combining sleep data with prescription drug usage history for example, will help clinicians understand if patients are experiencing negative reactions to prescription medications rather than experiencing a new health condition. Understanding that fitness device PGD can now be used to establish and strengthen the patient-clinician relationship sets the stage for creating a shared technical platform between clinicians. Once a technology is created to allow for clinician-patient communication, clinician-clinician communication is made possible. The largest hurdle in the adoption of new technology using fitness device PGD is obtaining support from clinicians. The newly realized clinical relevance of this data will drive that support and help promote the overarching need for shared health records within the medical community. Hurdles to clinicians embracing the use of fitness device PGD include issues with measurement tools and the accuracy of the data they produce. For example, various devices use different calculations for sleep data and many are sensitive or skewed by individuals who move in their sleep or have vivid dreams creating different measurements of sleep duration or sleep cycle (REM, etc.). The fitness devices are meant to be an estimate of certain calculations and not the equivalent of tests run in lab-controlled environments. However, fitness PGD combined with clinical data, lab tests and the like, will provide error estimates or accuracy percentage estimates. For example, a patient may not be able to participate in a two-week clinical sleep study, but their PGD in combination with clinical data from research of patients matching their demographic will set a benchmark for checking the accuracy of the fitness PGD. If the results are within 90-95% of the benchmark studies, the data can be deemed useful for a clinician's diagnosis.

As the market for these devices continues to grow there will be pressure to obtain FDA approval for fitness devices that lend themselves to integration with healthcare systems. Once clinicians actively adopt this technology and make it a prescription for patients during diagnosis and treatment discussions, pa-

tients will also be more inclined to use their devices in a more consistent, programmatic manner generating better PGD.

Companies such as Greenway Medical are already attempting to centralize health records but they are not yet integrating or collaborating with fitness device companies. Most fitness devices now give access to application program interfaces (APIs) that allow developers to analyze the data on a user's device. Once web-enabled interfaces like these are developed, clinicians within organizations like VA will be able to access to their patients' data, share it with members of the healthcare team, and link it with the electronic health record. Understanding the patient's needs inside and outside the doctor's office can lead to healthcare system improvements such as shorter wait times. If a clinician has access to patient data and can communicate to the patient prior to scheduling, realizations such as a patient just needing a prescription refill versus a patient needing urgent care (resulting in a higher priority spot in the waiting room) will be possible. This is just one example of many clinically relevant use cases fitness device PGD enables.

Patients will have the ability to select from a number of approved devices that monitor and allow them to enter data relevant to their health. Patients, healthcare administrators and clinicians will then have device freedom to access PGD. That is, they will be able to access data via the web regardless of the device they have (smartphone, tablet, laptop, etc.).

DEVICE FREEDOM FOR THE FUTURE

Because fitness device data is created outside the physical and device boundaries of VA, we must continue driving toward a vision whereby Veterans and their dependents, as well as VA customers and partners, will have the technology and support necessary to receive seamless services and information on any device, anywhere, anytime. By establishing device freedom policies and integration technologies, Veterans and the professionals that care for them would have the flexibility to share approved fitness device data.

If you have any questions about integrating fitness devices into healthcare, don't hesitate to ask CTS (askCTS@va.gov) for assistance or more information.

Check out earlier CTS Note editions [here](#) (vawww.blog.va.gov/oit360).