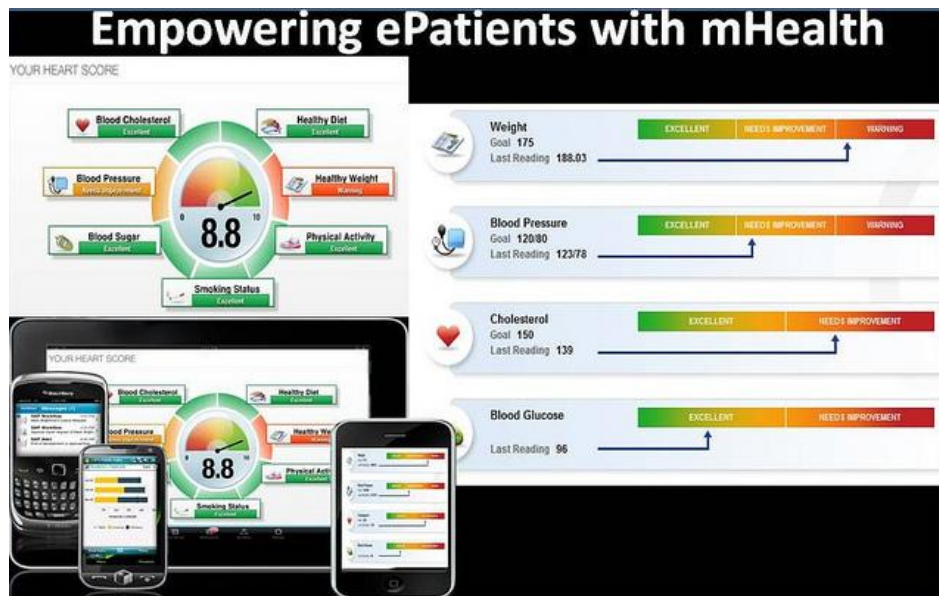


Will mHealth Apps and Devices empower Patients for Wellness and Disease Management? A Case Study



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A Point-of-View (POV) by

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Promising Years ahead for Healthcare IT and mHealth Adoption

2011, in my humble opinion, promises to be one of the most exciting years in terms of patient and physician empowerment thanks to the convergence of healthcare technologies including electronic health records (EHRs), healthcare information exchanges (HIEs), personal health records (PHRs), patient management and clinical information systems as well as the advent of exciting mobile medical devices, services and applications. The projections for the mobile market globally are impressive indeed. Gartner Group estimates that the mobile marketplace (worldwide voice, data, and services) will exceed \$1 trillion by 2014, and that smartphones will outsell PCs by the end of 2011. It is also estimated that almost 50% of the 2 Billion+ people connecting regularly to the Internet will access the web thru mobile devices over the next 2-3 years.

The stellar debut of the iPad as well as advancements in smart phones is driving innovation and emergence of mHealth (or mobile healthcare) (within the context of a hospital) as well as mobile health management (in the context of the patient/consumer) at a pace, that is simply unprecedented! A good lagging indicator is the emergence of venture capital funds like the [‘iFund initiative’ from Kleiner Perkins](#) to monetize innovation centered around the Apple iPad, as only one example.

Further acceleration is anticipated to happen given the emergence of competing tablet form factored devices including the Playpad from the makers of Blackberry, the Galaxy Pad from Samsung and many others from similar manufacturers like HP, Toshiba etc. It is this author's prognosis that the healthcare industry will be one of the earliest adopters of mobile devices, especially touch screen enabled tablets like the iPad across most users including patients, physicians, nurses, clinicians, hospital administrators and executives as well their counterparts from the insurance and life sciences industries. It comes as no surprise at all that life sciences companies across pharma and medical devices are among the earliest adopters of mobile devices like the iPad in an enterprise context.

As elucidated in my previous blogpost, [‘Will Social Media find “meaningful usage” in a healthcare context?’](#), a significant and relevant trend that has emerged is the [‘Life Blogging’ or Quantified Patient Movement](#) that is enabling millions of patients to monitor, measure,

share and control their health data on the web, leveraging PHRs, social media tools like Facebook, Twitter and YouTube as well as mHealth apps and devices. This trend is anticipated to further scale and accelerate with the ubiquity of smart tablet devices like the iPad and smartphones and the day is probably not very far off, when patient and physician will be sitting across the table from each other discussing the patient's condition while looking at a factual, accurate copy of the patient's medical history and health data on the patient's iPad, as basis for further treatment and follow up actions!

So what does this mean from an Patient Empowerment or an ePatient perspective?

To clarify the definition, who precisely is an ePatient? The Society and [the Journal of Participatory Medicine](#) define **ePatients** as *"individuals who are equipped, enabled, empowered and engaged actively with their physicians in their healthcare decisions"*, with the express objective of improving their relationships with their doctors and the quality of healthcare services they receive to improve outcomes.

In my previous blogpost, ["Can Life Sciences and Healthcare enable my transition from "Passive Patient" to "Enlightened Prosumer?"](#) I had outlined my vision for easy access to my medical records on demand, while ensuring that the data contained therein is factual, accurate and current. This is key for enablement and empowerment in the context of patients who are interested in taking charge of their health, especially in a post-acute or chronic condition management scenario. The business imperative for this is self-evident. At this time, there is a huge gap between "demand" i.e. patients that need care from both primary physicians and specialists and the "supply" number of physicians, clinicians, and nurses available to deliver high quality healthcare services at an affordable cost. This demands that patients also assume responsibility for managing their health, disease or chronic condition as best as is possible, across episodes of care and between visits to their doctors.

As elucidated in my previous blogposts, ["Who will make it Win-Win for Patients to adopt Personal Health Records \(PHRs\)?"](#) and ["My Personal Health Record \(PHR\) in Microsoft's Health Vault – Confessions of an Early Adopter"](#), this is easier said than done! Securing

paper or electronic copies of one's medical records, prescriptions, lab results etc., scanning them or converting them into an electronic format and uploading them onto a PHR platform like [Microsoft Health Vault](#), [Google Health](#) or [Dossia](#) is daunting indeed, especially for patients who are not very technology savvy. Happily, this is beginning to change given the drive and incentives for interoperability across hospital IT systems and PHRs, thanks to the [ARRA and Hi-Tech Act](#) championed by the current US government. The advent and early success of the *'Blue Button' initiative* that enables Medicare and VA patients to download electronic copies of their personal health records and upload them onto PHR platforms like Microsoft Health Vault, is a significant step forward to addressing this challenge.

Case Study:How can mHealth Apps and Devices help ePatients manage their Health?

The next daunting challenge for most patients is “how can my personal health data help me manage my condition once I have it in my PHR”? As stated in my blogposts above, not having intuitive tools like a *Personal Health Dashboard (PHD)* that provides a summary of one's vital signs and health implications thereof, at a glance has been a challenge. This has coerced a number of patients like my friend John Doe (his real name concealed to protect his privacy, of course) to leverage ubiquitous tools like Microsoft Excel (below) to chart and craft their very own PHDs. I thank John for consenting to be the subject of this featured case study in this blogpost and sharing his personal health information for this blogpost.

John, 45 years old, and a father of three children, is slightly overweight (high body-mass index (BMI)), has some history of heart disease, hypertension and high cholesterol in his family. He has been challenged and frustrated re: “making his blood pressure and cholesterol numbers” since he “is unable to control and manage what he cannot measure”!

Although not afflicted with any cardiac event or angina, he is a concerned ePatient and takes responsibility for managing his heart health, to minimize risks of a heart attack or stroke. John discussed his situation with his primary care physician and with him, collaboratively crafted a care plan (medication, diet and exercise) to lower and control his hypertension, cholesterol, and also reduce his weight and BMI. Key to success with his care plan is proactive measurement,

monitoring and control of his key vital signs, as lagging indicators of success. To accomplish this, John decided a few years ago, to leverage currently available online and mobile tools for personal health management.

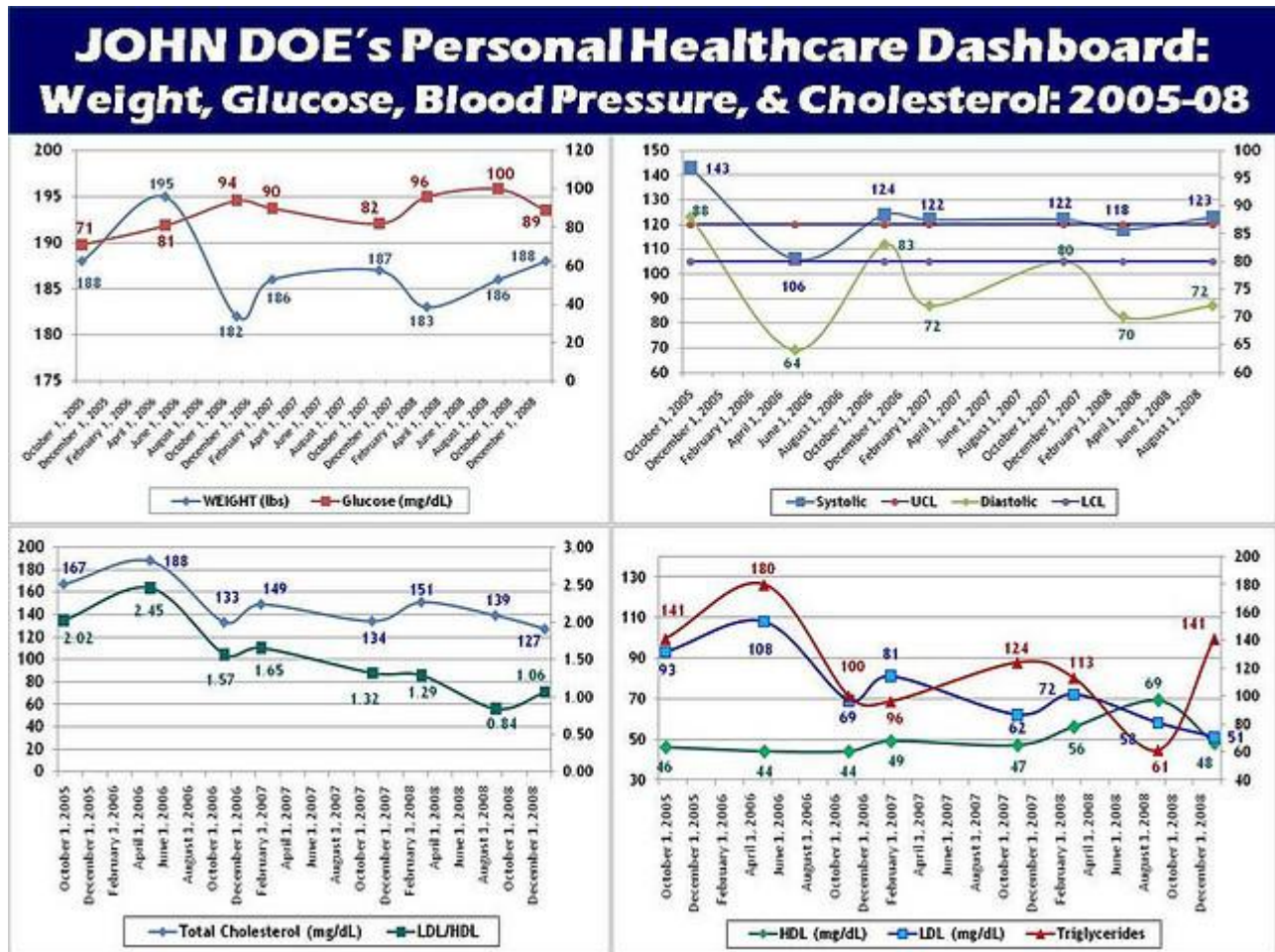


Figure 1. John's Personal Health Dashboard (PHD) crafted using Microsoft Excel.

John started off managing his condition by scanning copies of his medical records, uploading them onto Microsoft Health Vault and then manually entering the numbers into Microsoft Excel to create his **Personal Health Dashboard** (shown in figure 1 above).

However, comparing and contrasting these numbers and also setting thresholds and alerts on violations thereof, is a significant challenge. In the absence of these, it is extremely difficult for

patients like John to understand how well he is doing against his peer group or whether he needs to be concerned if one of his vital signs is above or below the previously recorded number.

Happily, PHR platforms like [Microsoft Health Vault \(with its plethora of partner solutions from both devices and service providers\)](#) and [Google Health](#) in its new avatar are beginning to address this challenge. Since John has been an active user of [Microsoft Health Vault](#), he is using new and novel apps (integrated with Health Vault) like the [Heart 360 Cardiovascular Wellness Center Application](#) from the [American Heart Association](#) and mobile devices like his Blackberry, and [Bluetooth enabled Omron blood pressure monitor](#) and [Tanita weighing scale](#) (see photo below) to manage his care plan and his heart health.



Figure 2. Bluetooth enabled BlackBerry, Tanita Weighing Scale and Omron Blood Pressure Monitor used for Personal Health Data Capture and wireless, automated Data Entry into Personal Health Record (PHR).

Given Microsoft Health Vault's partnership and integration with the American Heart Association, John signed up for the ['MyLife Check' PHD from Heart 360 Cardiovascular Wellness Center heart health app from the American Heart Association](#) for free. This well designed app

allowed him to transfer all of his relevant vital signs (weight, blood pressure, sugar, cholesterol, medications, physical activity, family health history, diet etc.) from his Health Vault and also enter current and recent readings into the app. in an intuitive and convenient way. John can enter these readings onto his Health Vault PHR and the 360 Cardiovascular Wellness Center app in one of three easy ways:

1. Directly enter his vital readings online using his Health Vault ID and password.
2. Measure his weight and blood pressure using his Tanita scale and Omron blood pressure monitor (or any Health Vault compatible device) to transfer readings from the instrument onto Health Vault, especially when at home. This required him to download the [Health Vault Connection Center app](#) from Microsoft Health Solutions. In the absence of bluetooth enabled devices, John can potentially use a device like [HealthPAL from MedApps](#) to transmit data from his devices to his Health Vault PHR.
3. Leveraging the utility of setting up reminders on the Heart 360 Cardiovascular Wellness Center to send text messages to his blackberry, with prompts to enter his weight, blood pressure and daily physical activity on a daily basis, or as often as is desired. This is particularly convenient when he is travelling on business with his portable blood pressure monitor with access to the weighing scale in his hotel room.

John can at any time, sign into his [MyLife Check](#) app using his Health Vault account ID and password online, or anytime, anywhere, on his iPad. The app greets him with a very intuitive PHD that tells him how well he is doing on his heart health on a 360 degree basis (on a scale of 1 to 10) at a glance. He can also set his heart health goals and thresholds (with recommendations based on his age and demographic factors) and see how well he is performing against his targets and thresholds on his dashboard, based on his last set of readings entered by him, or captured from the bluetooth enabled medical devices.

Personal Health Dashboard



Figure 3. My Life Check software application and Personal Health Dashboard (PHD) from the Heart 360 Cardiovascular Wellness Center - Summary Dashboard Visualization.

In sharp contrast to his Excel dashboard, the PHD from the Heart 360 Cardiovascular Wellness Center precisely points him to the vital sign(s) that need his attention or action to get him to his target levels with the ability to drill down and secure access to further information online, if needed. As well, clicking a button enables John to print a 10-12 page report with all of these details that he can e-mail as PDF in advance or carry in hard copy format, when he visits his primary care physician or cardiologist to discuss his current condition and continuous improvement action steps needed (changes in medication, exercise, stress levels etc.), if any.

Personal Health Dashboard



Figure 4. My Life Check software application and Personal Health Dashboard (PHD) from the Heart 360 Cardiovascular Wellness Center – Summary Visualization of Key Health Indicators.

The discipline of entering his weight, blood pressure and physical activity data almost on a daily basis, as well as his periodic progress on his cholesterol and sugar numbers (that he monitors thru visits to his physician on a bi-annual basis) has significantly contributed to his empowerment, a measurable change in his life style and enabled him to take charge of i.e. monitor, measure and control his heart health. He has lost significant weight (over 15 lbs), lowered his cholesterol numbers (to well within his threshold levels) with physical activity, yogic exercises and medication as well as his stress levels. His overall heart health score (shown on his dashboard above) at 8.8/10 tells him that he is doing really well, but also points and directs him to work on reducing his weight and BMI even further to further lower his risk of a heart attack or a stroke.

His doctors are extremely impressed with his regimen and his tools and reports and often cite him as a model and responsible patient who collaborates with them to actively manage his personal health and wellbeing!

In Summary

This blog post and the case study above are intended to go beyond the hype and provide an illustration of how well designed online and mHealth apps and off-the-counter devices like weighing scales, blood pressure and glucose monitors, when integrated well with PHRs, can enable real-world patients to monitor, manage and control their states of health, well being or chronic conditions.

While early apps have laser focused on specific conditions (like heart health, for instance, as illustrated above or diabetes), one can easily prognosize the evolution of ‘ambidextrous apps and dashboards’ going forward. These apps can potentially be configured for an array of conditions by the patient, for his/her specific condition and personalized to his/her needs, to enable and empower him/her to monitor the key health indicators (KHIs like vital signs) and manage his/her personal health on an every day basis, collaboratively with his/her physician or care provider, beyond the four walls of the hospital or clinic. In fact, this trend and its widespread, mainstream adoption by patients, can potentially be a key enabler and driver of the [Patient Centered Medical Home](#), going forward.

Delivering well designed software applications that can be intuitively used and integrated in a patient’s everyday life style (especially data entry) without significant or disruptive changes in behavior is key to adoption, usage and success with wellness and disease management, Healthcare IT solutions and mHealth apps and devices.

We will further discuss these key design principles in the next blogpost.

As always, your feedback re: this blogpost using the comments box, the accompanying facebook page or twitter are welcome!

COMMENTS RECEIVED FOR THIS BLOGPOST:

- Comment on 1.14.2011- Edward Marx says, "Excellent. Forward thinking. The future now."
Ed Marx, CIO, Texas Health Resources
- Comment on 1.11.2011- Bill Crouse says, "Thanks for this insightful post on what is possible today using commodity home monitoring devices to capture and record physiological data and solutions like HealthVault to store and share health data. I agree with your optimism on the velocity of change in the industry and the increasing opportunity for consumers/patients to engage."
-Bill Crouse, MD, Senior Director, Worldwide Health, Microsoft
- Comment on 1.26.2011- Geoffrey L. Glaser says, "As always, great post! Access and tools are important, but behavioral change needs to be more than Bluetooth and Google/Microsoft. Patient accountability will change when peer pressure from other members of the Continuum of Care can collaborate and motivate. Change through education along with collaboration and mobility will be the factors that result in better wellness."
-Geoffrey L. Glaser, Senior Executive, SAP e-Health
- Comment on July 28th, 2011- Ravi Bala says, "I suggest that we start with Physicians, PAs, NPs and Nurses first. If we can get them to create their dashboards, the message will get through to the patients. If every medical / nursing school and ECFMG / Board exam required a dashboard completion as a part of the requirement, we will have effective propagation. Dossia might be a way to go by making employers "encourage" this behavior change but the living by example approach with healthcare providers would have better success."
Ravi Bala, COO, HealthSignals