*mHealth*insights

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Intelligent healthcare through mHealth

Highlights

- Mobile health is enabling a new paradigm of intelligent healthcare that can enhance patient engagement and support access to care

- To be successful, developers must satisfy requirements from regulators, ensure clinical efficacy and determine payment structures

Information technology, and especially mobility, is disrupting and transforming the healthcare industry. A new paradigm of intelligent care is emerging that provides average consumers access to the knowledge, insights and capabilities of the best and brightest clinicians. For example, the US Food and Drug Administration (FDA) recently approved a mobile health (mHealth) app for diagnosing melanoma that was shown to be more accurate than the average clinician. New mobile information technologies combined with innovative business models are enabling individual consumers to leverage tools, applications and devices that allow for greater control over their health, more choice, better access and a decrease in overall costs.

So what do we mean by intelligent healthcare?

Intelligence occurs when an application uses advance algorithms, logic and/or artificial intelligence to simulate and/or replicate the decision-making process and guidance of expert clinicians. It does this by gathering data passively and/or actively from sensors, devices and human input to both understand the current health state of the user and provide confirmation or corrective guidance. This then leads to recommendations that can guide the user to healthier behaviours.

Intelligent healthcare tools allow users the benefit of having constant expert clinical advice and support, particularly for chronic diseases which require continual management. The reality is that most consumers/patients only see their doctors and nurses a few times a year. Clinical studies have also shown that these same consumers/patients struggle to remember and follow their doctor's orders. A recent study showed that half of patients discharged from a hospital after a cardiac event made serious errors in using prescription drugs because they didn't remember their doctors' specific advice.[1]

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A balance between patient control and productivity

Enabling patients to become an active participant of their treatment regimens supports their growing desire to have more control over their own health. In the recent PwC-commissioned global mHealth survey, *Emerging mHealth: Paths for growth*, conducted by the Economist Intelligence Unit (EIU) consumers cited empowerment as a powerful driver for mHealth adoption, followed by greater convenience and lower healthcare costs.

Patient engagement is not the only driver for more intelligent healthcare. As we look forward to the challenges of all healthcare systems, we find that all require a dramatic increase in productivity. In 1980 we had on average 10 patients for every healthcare worker and only spent about 8% of our GDP on healthcare and had virtually no shortages of doctors or nurses.[1] In 2020, however, the landscape looks quite different. By then the US will be spending over 20% of GDP on healthcare, will have an 800,000 person shortfall in doctors and nurses, and can accommodate three patients per healthcare provider.[2] Such a state is unsustainable. Yet by applying intelligence healthcare tools, applications and devices through mHealth, and empowering patients to self-help, they will get the support necessary to transform healthcare into a much higher productive state.

Components for intelligent mHealth solutions

To ensure the efficacy of intelligent apps, there are three key factors developers must take into consideration:

1) Don't be afraid of the regulators

While the FDA is still in the process of developing formal guidelines for mHealth solutions, its focus is on mobile medical apps that either convert the

mobile device into a medical accessory or help with the development of clinical decisions for treatment.

Therefore, the more intelligent an app, the more likely it will come under regulatory scrutiny. But the more intelligent it is the more consumers and clinicians will value it. Too often app developers, most of whom are new to healthcare, fear an FDA review and often create simple apps that send users back redundant information with no additional insight or meaning to enhance their chance of regulatory approvals. Such a course is folly and often leads to failure. According to the EIU survey, 67% of respondents who have used an mHealth fitness or wellness app with manual data entry discontinued it in the first six months.[3] To ensure long-term efficacy, developers should create solutions that go beyond the technology and mimics the value a clinician would provide.

Successful applications put 'clinicians in a box', meaning that they have algorithms, logic, and artificial intelligence to simulate and replicate the advice and direction that a clinician or other health expert would give consumers after observing their behaviours and analysing the data.

2) Solutions must factor in clinical efficacy

While regulators will require some level of clinical data for approval, clinicians will often times require even more. And what may seem intelligent to one clinician may be ignorant to another. Therefore, developers will need to be sensitive to the various validations clinicians will demand for.

3) Determine the payment structure

New business models continue to emerge within mHealth. Of consumers surveyed, 48% indicate that reducing costs is one of the primary reasons they are adopting mHealth solutions, yet the same survey indicates that cost is a barrier to adoption; of those using mHealth solutions, only 25% on average would pay more than $5 for an mHealth app. Those

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[1] PwC analysis; "Organization for Economic Cooperation and Development

[2] PwC analysis; "National Health Expenditure Projections 2010-2020", Centers for Medicare and Medicaid Services (https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads/proj2010.pdf); University of Southern Nevada, College of Nursing (http://www.usnnursing.com/LasVegas/Why-Nursing/Nursing-Shortage-%282%29.aspx#)

[3] "Emerging mHealth; Paths for growth", Economist Intelligence Unit, 2012

Chart 1: Costs patients who are already using mHealth services are willing to pay

	Not paying; covered	Free	Less than $1	Between $1–$5	More than $5
App/services that help manage their well-being through entering data manually	4.1%	33%	17.5%	23.2%	22%
App/services that help manage their well-being and receive data automatically	2.9%	22.4%	15.3%	34.1%	25.3%
App/services that help them communicate better with healthcare professionals	9%	33.9%	13.8%	18%	25.4%
App/services that integrate with medical devices to send data on their condition to healthcare professionals	3.5%	15.1%	17.4%	25.6%	38.4%
App/services that gather general information on healthcare, including drugs	13.7%	40.5%	12.2%	16%	17.6%
Other	15.4%	69.2%	0%	0%	15.4%

Source: Economist Intelligence Unit, 2012

Chart 2: Costs patients without mHealth services would be willing to pay

	Nothing	Up to $1 per year	Between $1–$5	More than $5
App/services that help manage their well-being through entering data manually	33.9%	21.9%	31%	13.2%
App/services that help manage their well-being and receive data automatically	33.3%	22.8%	27%	16.9%
App/services that help them communicate better with healthcare professionals	30.8%	20.5%	32.5%	16.2%
App/services that integrate with medical devices to send data on their condition to healthcare professionals	20.6%	21.1%	40.2%	18.1%
App/services that gather general information on healthcare, including drugs	35.3%	21.8%	30.1%	12.8%
Other	90.2%	2%	5.9%	2%

Source: Economist Intelligence Unit, 2012

without mHealth services, only 15% on average are willing to pay that much[4] (see charts 1 and 2).

Therefore, many apps replicate the paid search model where the app and service is free to the consumer and is paid for by a product or service vendor. Others follow a 'freemium' model where basic services are free but they charge a value-added subscription where consumers pay between US$1-$20 per month for a service that is not paid for by a third-party. Some apps are provided by payers or providers as free to consumers because they eliminate administrative and operating costs for those offering the app.

Finally, we have seen from the EIU survey results that payers are increasingly reimbursing for some of these services since they provide good quality care at low costs; indeed, the National Health Service in the UK recently suggested that clinicians subscribe an

app to deal with a patient's needs when it could replace an office visit. Global downloads and revenues in mHealth apps have exploded and reached US$718 million in 2011 according to a report from Research2Guidance[5], and most of these revenues originate from consumers paying for services that, according to our survey, decrease costs, provide greater convenience, and enable greater control of their health.

The general consensus is that intelligent healthcare will continue to grow at a global level. While the drivers are currently in place to sustain momentum, key stakeholders, including providers, medical device companies and developers, must work together to ensure adoption is possible over the long-term and that it meets customer expectations.

[4] Ibid.

[5] "Mobile Health Market Report 2011-2016: The Impact of Smartphone Applications on the Mobile Health Industry (vol. 2)", Research2Guidance, 9 January, 2012

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