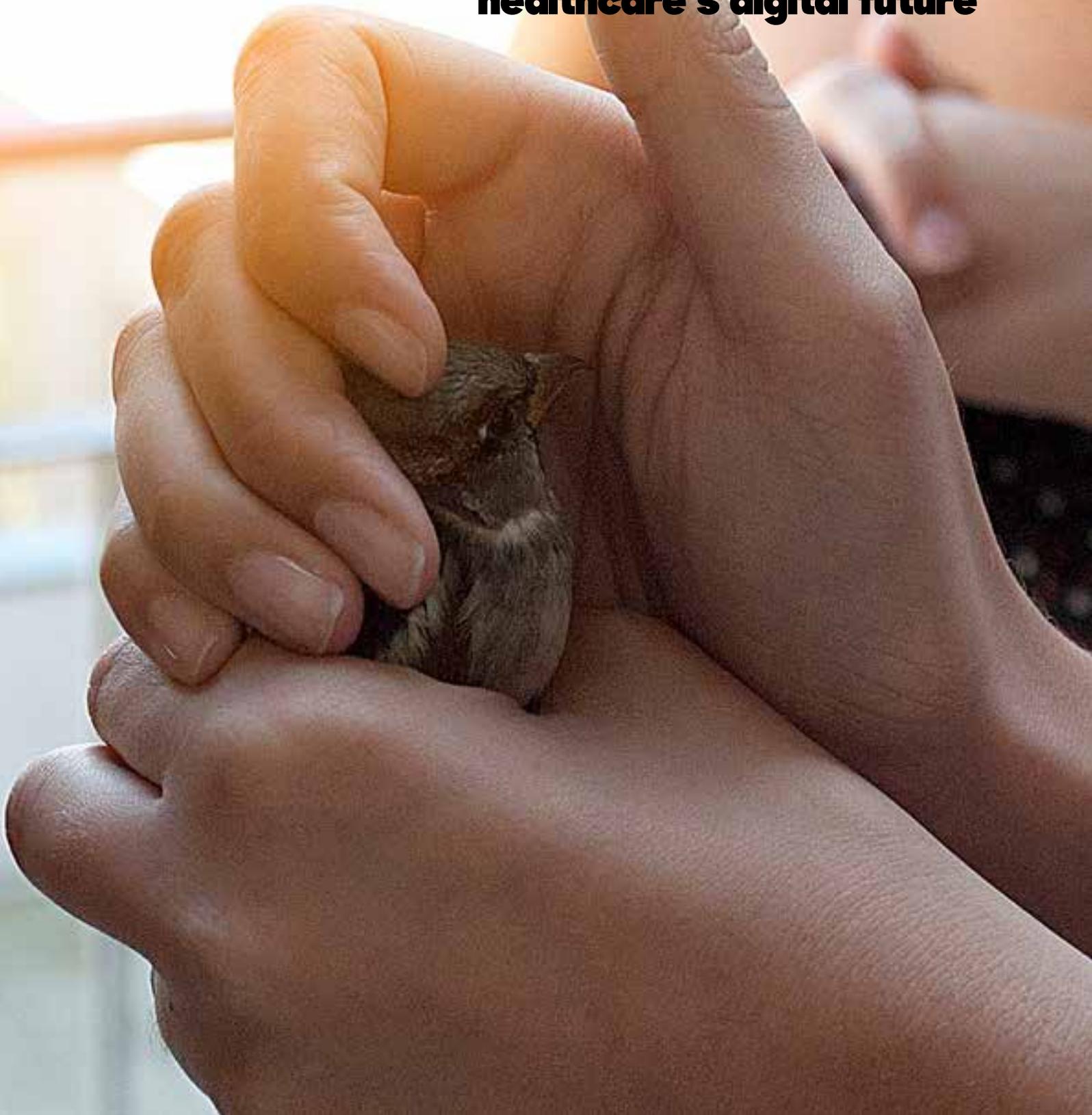


Knowledge Is Power

**Empowered patients and
healthcare's digital future**



futurice

Healthcare is undergoing major changes spurred on by, but not limited to, technology. Digitalisation is changing the way we think about health, what taking care of it really entails, our personal role in healthcare systems and the way we interact with technology in the context of health.

In many ways, we are entering a post-institutional age of increased personal responsibility, which presents healthcare service providers and other players in the field with major opportunities and great risks. Technology has the potential to empower people and help them become more active in the management of their and their families' health. This will change the relationship of the patient and the caregiver in profound ways.

We see ten major trends steering healthcare's digital future.

I

Empowered and Informed Patients

The single biggest impact digitalisation has had on our society is the increased production and easier distribution of information. Patients today have access to an exponentially larger volume of information. Regardless of the accuracy of the information patients are exposed to, they expect healthcare professionals to acknowledge their opinions and engage with them on a more equal footing than before. They are more likely to self-diagnose and self-medicate.

Patients today want to be engaged, empowered and educated. They should be seen as consumers and "co-producers" of their holistic well-being, not just of better health. They are willing to expend effort to play a more active role in the management of their health.

Patients are more likely to follow a clinician's prescribed medication and treatment plan if they feel invested in it.

Informed, engaged and empowered patients are an integral part of all sustainable healthcare systems.

Facts

Empowered patients are an asset to society. At least 80% of patients in the UK actively seek information on the Internet about coping with health problems.

(European Patients Forum 2015)

81 percent of people 65 and over in the US say that technology is important in their everyday lives and 68 percent of them consider technology to be "very important" or "somewhat important" for managing their health.

(Accenture 2015)

A 2010 study found that 60 percent of diabetes patients who had access to a portal with information about their condition had improved health outcomes.

("Patient Web Portals to Improve Diabetes Outcomes: A Systematic Review", National Centre for Biotechnology Information, USA, 2010)

Challenges

Research shows that three out of four people seeking health information online do not consistently check the validity of the information they find.

Privacy issues, cyber criminals, lack of health data privacy awareness are also a risk when people look for solutions to health issues online.

Healthcare systems, providers, policy makers and designers need to ensure that care quality is not undermined by empowerment and "consumerization" of services. The limits of what patients can be expected to deliver should be acknowledged.

Opportunities

There will be great demand for developing competencies and adapting relevant

technologies to help professionals support patients as they manage an increasing share of their health. Providing education about health data privacy is a potential growth area.

User experiences and interfaces will have to be extensively customized for different user segments. The way so-called silver surfers approach and use technology are very different from how millennials tend to behave.

Adoption of new healthcare engagement models will allow providers to cut costs, free up clinicians and other resources, and deliver better health outcomes.

II

Resource Scarcity and Cutting Costs

In healthcare it's not necessarily about how to generate more revenue per patient. It's about how to take better care of the patient.

Jeff Fountaine, Honeywell (2015)

Doing more with less should be our motto in all fields, including healthcare. Hospitals and other healthcare providers are striving to control spiraling healthcare costs, rising due to a variety of factors, including an ageing population. Costs will decrease as the field becomes less capital-intensive and more investments are made in improving quality, prevention and remote monitoring.

Providing patients with the option of monitoring their own condition with intuitive medical devices and branded apps can significantly reduce costs. Digital and mobile patient engagement saves resources.

Facts

Aligning resources with strategic priorities and applying modern industrial engineering techniques, such as standardizing processes and the flow of patients through the facility, can reduce health plan administrative costs by as much as 25%.

(www.strategyand.pwc.com)

A US study found that hospitals offering a superior patient experience tend to have 50% higher margins than their peers.

(Accenture 2015)

According to innovative cardiologist **Eric Topol** of **Scripps Green Hospital** in La Jolla, CA, inexpensive mobile ultrasound scans performed as part of routine exams and cheap smartphone add-ons that can serve as EKG monitors can eliminate \$600 per visit when compared to performing the same test using a full-scale machines.

Figures suggest that 6.9 million outpatient hospital appointments are missed each year in the UK. In 2012 and 2013 the average costs incurred per missed appointment were £108. They can cause serious delays in treatment for other patients. Simple initiatives like sending email and text reminders are now used by many clinics and have had an impact: outpatient DNAs have fallen to 9.1% from 10.5% in 2008/9.

www.england.nhs.uk

Challenges

Providing patients with clear information and transparent pricing is a challenge, as is keeping them engaged in their own care. If patients don't receive timely treatment for their conditions or don't keep up with their recovery instructions, they may end up needing more intense and expensive care down the line.

Integrated delivery networks, health information exchanges, accurate patient data and records and access to information increases service are, individually and together, issues of huge complexity and pose healthcare and service providers major challenges now and in the future.

Opportunities

In addition to potentially lowering costs in the long term, patient-centered care models are already contributing towards higher quality of care and a better patient experience. Technology improves nursing productivity and satisfaction, increasing patient satisfaction and well-being.

Remote monitoring allows healthcare providers to reach out to patients in a timely manner,

making it easier to engage them and ensure their active participation in their own care. Providing patients with telehealth services after discharge as well as using branded and gamified apps and devices as a part of follow-up care has the same beneficial impact. And it helps cut costs.

III **Self-Service Express**

In the future, it's imperative that healthcare service providers are present where people shop, live, work and play. Healthcare and well-being services need to be conveniently slotted into people's everyday lives. Regional hospitals are adapting existing retail facilities. Spaces within well-situated retail centers now often act as frontline facilities for major healthcare systems.

Affordable prices for on-the-go services and wearable devices will form an integral part of prevention and wellness protocols. Online tools and mail order health services, such as pharmacies, can be used to supplement the convenient care and services provided where people live their everyday lives.

Facts

85% of U.S. health consumers say that email, text messages and voicemail are at least as helpful as in-person or phone conversations with healthcare providers.

1/3 consumers admit to being more honest when talking about medical needs via automated voice response systems, emails or texts than face-to-face.

(Healthy World study, Technology Beyond the Exam Room by TeleVox)

1/3 consumers who participate in online activities are keen to use smartphones or tablets to "do" health online.

(The Harris Poll)

Challenges

Maturity is an issue that applies to both the employed technology and the skills of the users.

The technology needs to be mature enough to reliably provide the needed services. The services need to be designed in a manner that allows for user segments with varying levels of familiarity in using digital services to achieve their goals.

Related to this is the necessity to keep evaluating when hi-tech is the appropriate approach and when "hi-touch". Sometimes human interaction is absolutely required.

Care quality should never be sacrificed to achieve lower costs.

Opportunities

Thanks to technological development and an increasing willingness by patients to take greater responsibility for their care, there are many ways to cut costs without sacrificing quality of care.

Thanks to access regardless of time and location, mobiles and watches are great assets for on-the-go services. Services for mobile and wearable devices can be used to supplement and augment services provided by healthcare providers who are present where people naturally congregate as a part of their everyday lives.

IV **Looking for a Better Experience**

Today's patients are consumers of healthcare services and have high expectations for their customer experiences. It's important to be able to offer them maximum convenience for all health, well-being and fitness related visits, including an option to visit a nurse practitioner when a consultation with a doctor is not necessary.

Retail clinics with convenient opening hours and locations make it easier to slot visits into the patients' lives, increasing their motivation to properly manage health and well-being.

Providing caregivers with easy and secure access to the patient's previous medical information is important. Integrated delivery networks help

caregivers answer any questions they may have and provide additional information for properly addressing the patient's healthcare issues.

Facts

Mothers are healthcare gatekeepers for families. With over 70% of mothers are juggling busy schedules at work and at home, convenience becomes an important factor in healthcare provider selection.



A Harris Interactive/HealthDay survey

reports the number of people who use the retail health clinics has jumped from 7% in 2008 to 27%. Unsurprisingly, younger adults are more likely to use this type of clinic than older adults. 40% of adults between the ages of 25 to 29 used a retail or work-based clinic, versus only 15% of adults aged 65 and older.

Challenges

Unlike other businesses that only care about giving consumers what they want in order to make a sale, healthcare professionals have a responsibility to provide the public with what it needs - even when it's not necessarily what it wants. This can have an adverse impact on the customer or user experience. Very often, patients don't really want to be there. For a UX designer this is presents a major challenge.

Opportunities

Convenient, retail-oriented clinics providing a defined set of services makes it easier to make the pricing transparent, lowering the threshold of using healthcare and well-being services.

Case - Telemedicine services in Kenya

Many telemedicine projects under way in Kenya, are enjoying measurable success in areas such as malaria prevention and treatment. Mashavu, for instance, which means chubby-cheeked in Swahili, is an

initiative that utilises kiosks manned by trained volunteers, offering people living in remote areas the opportunity to undergo basic diagnostic tests. The results of the test are then electronically sent to a doctor who can say if a consultation at a healthcare facility is necessary.

M-health helps improve and streamline national healthcare efforts in Kenya. Clinics embracing m-health initiatives do not need to refer visitors to larger hospitals, cutting down on travel

time and costs for the patient. They also allow for better distribution of the patient load and lessen bottlenecks at larger hospitals. They also aid in the timely and effective distribution of medicines, leading to an overall improvement in the national healthcare service.

Hospitals and healthcare providers can learn how to provide a better experience by benchmarking other industries - especially the retail industry.

V

Open Innovation

In healthcare, open innovation involves everyone- physicians, nurses, pharmacists, patients and other individual inventors. Together they define what kinds of services and products they want to use as well as when and where they want to use them.

In the medical technology community, open innovation provides diverse professionals with the best understanding of a problem, empowering them to create a solution.

Often the best innovations are created locally and are in tune with the real needs of the patients they serve.

Open innovation finds the right problems to solve.

Facts

Institutions that use open innovation - e.g. **Unilever Global, Samsung, Edison Nation Medical** and others - call on inventors to confidentially submit their ideas to teams of experienced evaluators, legal professionals and commercialization experts. These companies have a variety of means through which an inventive idea can be commercialized, including startup accelerators and incubation models.
(Medical Product Outsourcing)



Challenges

Healthcare companies still tend to rely on outdated administrative technologies, which slows innovation down. Bridging the technology gap requires significant financial investment, effort and commitment on the part of healthcare systems.

Opportunities

Open innovation actively seeks out currently relevant problems to solve in a field undergoing changes and offering services everyone needs sooner or later. All you have to do is create situations and environments where the relevant people can be brought together to co-create and help the industry innovate.

Patients living with chronic conditions are a segment sometimes referred to as “the most under utilised resource in the healthcare system”. Find innovative ways to engage them to help you find the right solutions for managing their pain.

Platform creation offers access to the best

insights from the community and the use of open APIs from startups that provide services, to the benefit of both platform creators and their customers.

VI Fun = Engaging

Taking care of your health doesn't have to be a chore. Especially with children (and to be honest, adults, too) finding a fun way to engage with the therapeutic path improves results significantly and keeps the patient from straying or taking harmful shortcuts.

Gamification is a powerful tool for nudging people's behavior. Motivating factors include status, as

well as public displays of achievements and accomplishments. It also generates a lot of data that can then be analyzed to improve and enhance interactions between the gamified program and the user.

Gamification can also be used to educate patients, healthcare workers and the general populace on a variety of issues affecting their health and everyday life. It's especially useful for engaging patients in remote and rural areas, who are enrolled in telehealth programs.

Facts

An estimated 50% of patients with chronic diseases do not follow the prescribed treatment.
(Forbes, Dr.B.Meskó, 2014)

85% of the tasks in our daily lives will include game elements by 2020.
(Electrical and Electronics Engineers 2014)

Packy and Marlon, a game designed to help kids better manage their juvenile diabetes, led to a 77% reduction in the players' diabetes related urgent care and emergency clinical visits.
(edisonpartners.com)

Challenges

Creating a real understanding of what motivates your desired audience and keeps them engaged can be a real challenge.

The interaction between the service and the

Case - Better mental health services for the South Karelia Social and Healthcare District

As manager for mental health services provided by the **South Karelia Social and Healthcare District (Eksote)**, **Timo Salmisaari** made some changes. By centralizing the mental health and substance abuse services of all the district's municipalities and employing a more user-centered approach in defining what services are offered, the district has significantly increased the efficiency with which it delivers these services. Hospital care has decreased by 50% and use of outside service providers for people with substance abuse issues by 70%. Net costs have gone down, there's no sign of a resource shortage and both employee as well as customer satisfaction are up!

patient who inputs data about their health means that there are very stringent patient privacy regulations to contend with in all potential markets. Data protection poses a serious challenge.

Can users make meaningful choices? Are they challenged? Are they in control? Who's playing? Who's collaborating? To whom will users display their status? The answers to these questions need to be clear.

Constantly considering the needs and baselines of different user segments is a challenge.

Opportunities

A lot of research and results out there show that trying to develop effective gamified intervention methods for education and training in health care makes sense and helps engage patients in the management of their own health. It's one

way to empower them.

Gamification makes interactions with patients more effective and provides tangible, engaging and motivating feedback to both the "player" and the caregiver.

VII Care Tech

Inexpensive sensor technology allows us to measure critical health parameters effectively, and conveniently - tiny, wearable, sensors collect data without interfering with our daily lives. The collected data helps us and our caregivers make better, more informed, quantifiable decisions.

Web-based portals that enable regulatory compliant video interactions between patient and clinician are now supported by a wide array of web-integrated wireless monitoring devices, providing remote interactions with caregivers a whole new level of depth and efficacy. The interactions also increase the patient's understanding of their own health.

The diversity of digital health technologies available for people to purchase will keep increasing, with the development of more robust, impactful and diversified technologies that are better integrated with each other and the users' lives.

Facts

Jupiter Research projects that the wearable technology market will be worth \$19 billion by 2018. **Tractica** forecasts that consumers utilizing home health technologies will increase from 14.3 million worldwide in 2014 to 78.5 million by 2020.

PwC asked consumers what was more important to them: privacy or convenience. The answer depended on the type of data. 73% rated the privacy of their medical records as more important than convenience of access. For data regarding diet and exercise, ca. 60% percent said convenience of access was more important than privacy.

(HRI, PwC, 2014)

Management of chronic diseases still consumes about 70% of healthcare costs. Only 30% is spent on preventive healthcare and wellness. (FierceMobileHealthcare, 2013)

Challenges

Almost nothing can be done in the medical device industry without the involvement of compliance lawyers.

A common concern is that consumers' initial excitement with wearables will fade away if they have limited success achieving their health and fitness goals.

Opportunities

A remote monitoring device, a wearable or an implantable that's intuitive enough to sense patient status will boost the patient's confidence in using IoT devices and the care provider's confidence in recommending and prescribing them. The generated data will improve care and help patients reach their goals as well as stay more informed about their own health.

Case: Pain Squad app improves reporting of symptoms by young cancer patients

Pain Squad is a smartphone app that tracks levels of pain experienced by young cancer patients ages 8 to 18. It was developed by the **iOUCH** research team at the **Hospital for Sick Children** in Toronto, Canada. The app, which users interact with every morning and evening, uses gamification to reward children for reporting on their pain level, location, reason (cancer or treatment), etc. It helped increase self-reporting of symptoms by young cancer patients from 11% to 90%.

The combination of technological maturity, consumer eagerness to use apps and devices, and physicians' willingness to work with the generated data all point to home health care as a major rising trend.

VIII Mobility

The smartphone will be the hub of the future of medicine, serving as a health-medical dashboard.

(Forbes 2014)

Mobility is one more way to provide a convenient service, make people feel cared for and connected as well as inform and educate. Mobile allows you to reach people regardless of time and location.

Millennials are major drivers of healthcare disruption, as developers of new technologies, founders of new companies and a large new insured population. They will demand a healthcare system that offers them convenient mobile and digital tools that slot into their everyday lives.

And it's not just the young. Tailored mobile apps for senior care facilities, used in conjunction with condition specific apps for educating patients and monitoring symptoms, appear to form an efficient patient engagement strategy for this expanding and costly demographic.

The universality of digital communication means that many doctor-patient contacts are now virtual and deliver care to the patient in their home, especially in remote areas of the world. Home healthcare services and innovative technology will allow for doctor-patient connectivity in previously unavailable places, saving both lives and money. Patient monitoring before, during and after a procedure can now include autonomous robots and thanks to integrated health information exchanges, the care provided in this manner is of a higher quality than ever before.

Facts

All consumers, regardless of generation, welcome the era of personalized medicine via digital communications, and are looking for these messages to be personally tailored. 49% are open to receiving medical care between

visits via email, so there's consumer demand for telehealth services.

(Healthy World study, Technology Beyond the Exam Room by TeleVox)

Mobile technology trials showed a 15%-20% reduction in hospital days and 30% fewer ER visits.

(MobileSmith, Inc. 2014)

The mHealth market is forecast to be a mass market, potentially reaching billions of smartphone and tablet users, by 2017.

(Fierce Mobile Healthcare)

A report by research2guidance predicts that mobile healthcare services market will begin the commercialization phase and reach \$26 billion worldwide by 2017, as smartphone apps enable the mHealth industry to monetize these services.

(Fierce Mobile Healthcare)

Challenges

Mobility carries security risks: malware, thefts and cyber attacks threatens confidentiality and erodes patient trust.

Opportunities

Use of mobile devices for diagnostic procedures is increasing, which are more frequently performed at home. Mobility is the key factor in making healthcare quick, portable and personal. Medical mobile applications can be extensively customized depending on the user and prescription.

IX Who Cares

Technology helps keep everyone involved in the patient's care connected and informed. Patient, family and healthcare providers share and coordinate medical data and history. Constant communication with the family by healthcare providers can make a stressful experience easier when the patient trusts that everyone involved has all the necessary information to make the right care-related

decisions. For example, if the patient goes to a specialist or elsewhere for care, it's important that the patient's primary care provider has easy access to up-to-date records.

To better track and securely share a patient's complete medical history, more healthcare providers are participating in health information exchange (HIE). HIE helps facilitate coordinated patient care, reduce duplicate treatments and avoid costly mistakes. A consumer-mediated exchange provides patients with access to their health information, allowing them to manage their healthcare online.

Facts

Improved patient safety is one of the most promising advantages provided by a health information exchange (HIE). Up to 18% of patient safety errors and 70% of adverse drug events could be eliminated making the right information about the right patient available at the right time. Health information exchange makes this possible.

(doi:10.1016/j.jbi.2007.08.011)

Challenges

When necessary for their medical care, patients are willing to share their health information, but if they feel it's not being shared securely, they're likely to seek care somewhere else.

There is a risk that this kind of information sharing could put the patients' private data at risk, damaging a crucial component in healthcare management - for both patients and doctors.

Opportunities

HIE should reduce documentation time, automate critical processes in preventive and chronic disease care and reduce medical errors. Doctors and caregivers can see online whether the patient recently had a test or procedure, as well as the the results. No need to repeat the procedure. This saves time and money. By preventing duplicate tests and procedures as well as other waste related to inefficient distribution of information, HIE makes healthcare less expensive for everyone.

X

Humanized Tech

The new patient-clinician partnership is based on increased awareness, as well as improved self-management and prevention strategies.

Behavioral healthcare design is important and its role in healthcare design is becoming more and more significant. Design criteria that drive any healthcare facility are creating humanized interior spaces that respect the patient's dignity, ease patient anxiety and improve the healthcare delivery process. The same design criteria can be applied to designing healthcare technology.

Humanized health technology empowers users to engage more actively in the management of their health and wellbeing.

Facts

There will be 5.4 billion worldwide machine-to-machine connections by 2020. A solution is Internet Of Things if it's:

- *Aware* - The connected asset is able to sense something about its surroundings
- *Autonomous* - The data from the asset is transferred seamlessly and automatically
- *Actionable* - Analysis of the data is integrated into the business process

(news.verizonenterprise.com/2015/03/healthcare-iot-humanization-technology-connected)

Challenges

A clear vision and high-quality care as a defined goal are needed to use technology to its fullest potential.

Designing and implementing technology with the sole aim of increasing profits does not produce an optimal outcome and should be avoided.

Monitoring devices and platforms with complicated user interfaces and complex mobile applications will never breach today's tech divide. Smart devices, especially for the elderly, must be intuitive enough to require limited patient

programming and interaction.

Opportunities

By utilizing the emotionally sensitive health care design criteria in the holistic healthcare design process, patients will be engaged and feel safe.

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