Top 10 Health Tech Trends

February 2022

Health Tech Trends

1 Quantum leap of 5G in connectivity creates tremendous opportunities and has set the stage for large scale disruption in healthcare

2 The next chapter of Telehealth : Technology changing the patient-doctor dynamic

3 Conversational Artificial Intelligence (AI) is speaking volume in healthcare

4 Empowering clinical trials with technology in a decentralized world

5 Moving beyond marketing apps to regulated DTx and software as a medical device (SaMD)

6 Gamification in healthcare is gaining momentum as it is making difference in the modern healthcare

7 Digital Biomarkers : Transformation through Novel Evidence, Deeper Insight and Empowering Engagement

8 Wearables/Sensors : Giving comfort through remote monitoring

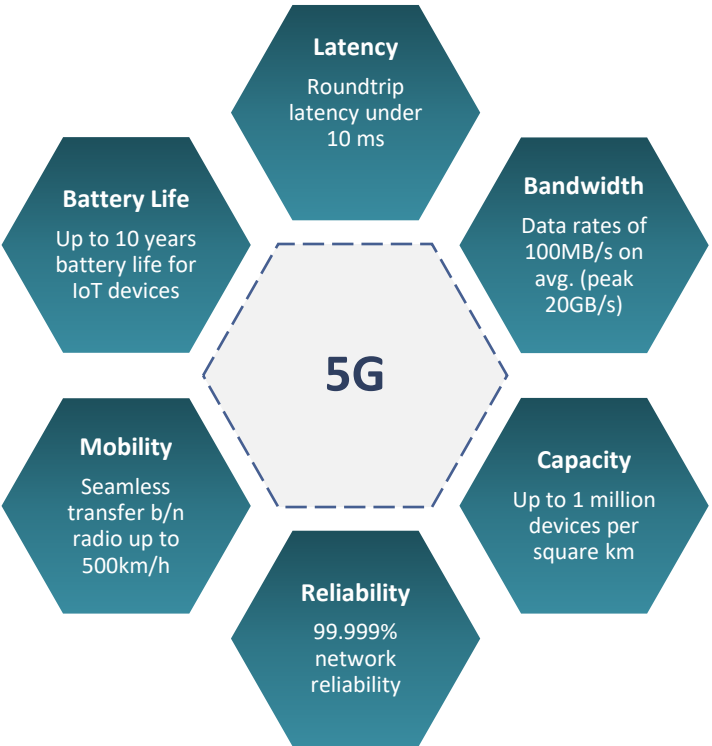**9** Tech is the savior in the healthcare interoperability journey

10 Behold the Metaverse : Healthcare on the verge of disruption

1. Quantum leap of 5G in connectivity creates tremendous opportunities and has set the stage for large scale disruption in healthcare

5G

Latency
Roundtrip latency under 10 ms

Bandwidth
Data rates of 100MB/s on avg. (peak 20GB/s)

Battery Life
Up to 10 years battery life for IoT devices

Mobility
Seamless transfer b/n radio up to 500km/h

Reliability
99.999% network reliability

Capacity
Up to 1 million devices per square km

Real time high-throughput computational processing

High-resolution images and files require high-throughput computational processing for diagnostics and design

Example: Workspot, Netgain, & Fordway are leveraging Virtual Desktop Infrastructure

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The 5G Connected Ambulance

Healthcare workers performed the **UK's first remote diagnostic procedure** in a 5G connected ambulance

Example: It was possible through a collaboration between **Ericsson, UHB and King's College London**

Remote Surgery/tele-surgery

5G can meet data-intense, millisecond-latency requirements for telesurgery-remotely operated responsive, high precision surgeries

Example: 5G remote brain surgery of a patient suffering from Parkinson's disease from 200 Kms away at Beijing Tiantan Hospital

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Video analytics for behavioral recognition

In hospitals, care homes, psychiatric centers etc. video analytics can be used to identify patients who are behaving odd

Example: Viisights is working on such smart behavioral recognition systems

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The way ahead

6G is considered to be a key enabler of intelligent healthcare (i.e., Healthcare 5.0). Technologies such as **edge intelligence (i.e. cloud/edge computing + AI), holographic communications, tactile Internet, and Internet of Bio-Nano Things (IoBNT)** are expected to play a key role

2. The next chapter of Telehealth: Technology changing the patient-doctor dynamic

Strong continued uptake, favorable consumer perception, regulatory environment, and strong funding are all contributing to increasing rate of adoption

38x
higher telehealth utilization than before the pandemic

57%
providers view telehealth more favorably than before COVID-19

50%
telehealth uptake varies by specialty, with the highest penetration in psychiatry

Unified digital experience platform

- Healthcare is moving from siloed digital facades to a truly unified platform
- The platform integrates patient access, intake and engagement to improve patient communication, decrease no-shows, centralize processes and increase collaboration

Technological advancements

- **Video conferencing**: moving away from 1:1 patient doctor calls to **include family members**
- **Tele-ICU**: one ICU physician can be "on duty" for multiple hospitals and can **remotely monitor patients** both medically and visually
- **Video-enabled medication adherence**, connecting carers directly to the patient through the high speed 5G connections

A look into the future

- Enabling **all physicians to have the same window into a patient's medical history** and care plan so they can provide integrated, longitudinal care
- **Telesurgery**, where a specialist can perform an operation from a remote location
- Testing patients with conditions for changes in their heartbeat, blood sugar and blood pressure multiple times a day using **cloud-linked scanners**

EXAMPLES

pCare's VideoConnect product to enhance clinical workflows, patient experience and access to care

Mary Washington Healthcare adds advanced tele-ICU services for patients needing critical care

Companies like Asensus are working towards making telesurgery a reality

3. Conversational Artificial Intelligence (AI) is speaking volume in healthcare

COVID-19
Pandemic has worsened the shortage of doctors and other healthcare workers globally
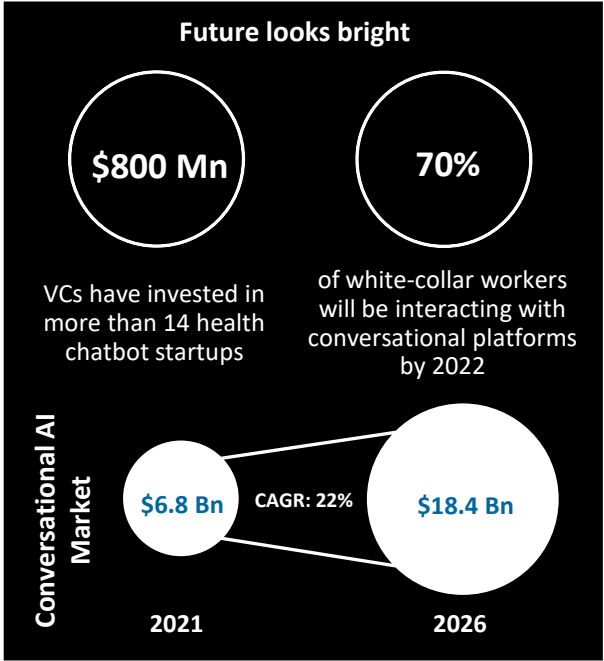
Regulations
Payers and providers need to find ways to publish information for members in easily accessible formats

Consumerism
Increasingly, consumers prefer digital channels (SMS, web chat, mobile app chat, etc.) to traditional voice interactions

Tech Advancements
Advances in clinical language understanding are creating new opportunities for conversational AI

Future looks bright

$800 Mn

VCs have invested in more than 14 health chatbot startups

70%

of white-collar workers will be interacting with conversational platforms by 2022

Conversational AI Market

$6.8 Bn — CAGR: 22% — $18.4 Bn

2021 **2026**

- Alexa serves elderly with its new offerings; Alexa Smart Properties and Alexa Together
- With its voice capabilities, Alexa helps in keeping old patients and their care takers close and always connected

amazon

Microsoft

- Microsoft grows health-care presence by acquiring Nuance's speech recognition and transcription business for $19.7 Bn
- Ambient sensing to listen to the conversations and offer workflow and knowledge automation to complement the EHR of the patient

- CVS expands talking prescription labels to all locations to support visually impaired patients
- The solution, called Spoken Rx, was designed in collaboration with the American Council of the Blind

CVS Health

lifelink SYSTEMS

- Lifelink Systems assisting Genentech with a suite of advanced conversational technology solutions
- Digital assistants to help clinical trial participants, patients, caregivers, and providers to receive personalized assistance and support

4. Empowering clinical trials with technology in a decentralized world

Pandemic disrupted traditional clinical trials

|			
Eli Lilly halted enrollment in ongoing studies and delayed the launch of new trials	**54%** of the clinical trials were suspended owing to the pandemic	Eli Lilly halted enrollment in ongoing studies and delayed the launch of new trials	**70%** of potential clinical trial participants live more than two hours from a study center

Advanced trials enabled by technology

	Decentralization *e-visits & data is collected remotely from sites*	**Real World Evidence** *Data flows from pool of real-world evidences*	**In Silico & Digital Twin** *Data simulation to reduce the need of collection*
Trial Advancement	• Consent obtained using remote technology • Trial recruitment through targeted **internet searches & social media** • Data collected **remotely through wearables/AR/VR or implanted devices**	• **NLP** offers an automated way to effectively process unstructured RWD text • **Cloud and big data technologies** help companies generate and store RWE for these studies	• Data is **created by predicting** how that patient would likely evolve over the course of the trial if given a placebo • RCT trials powered by Digital Twins in early-stage trials gave the same results with **up to 50% fewer subjects**
Examples	*PRA and ICON collaborate to deliver differentiated decentralized trial solutions*	*Novartis launched RWE trials studying various treatments, including CAR-T cell therapy*	*Novadiscovery to provide Janssen its JINKO clinical trial simulation platform*

Sources: MRN, Deloitte, Clinical Trials Arena

5. Moving beyond marketing apps to regulated DTx and software as a medical device (SaMD)

Pipeline of Digital Therapeutics (DTx)

33 Discovery

46 Proof of Concept

10 Pivotal Trial

25 Approved

23 Commercially Available
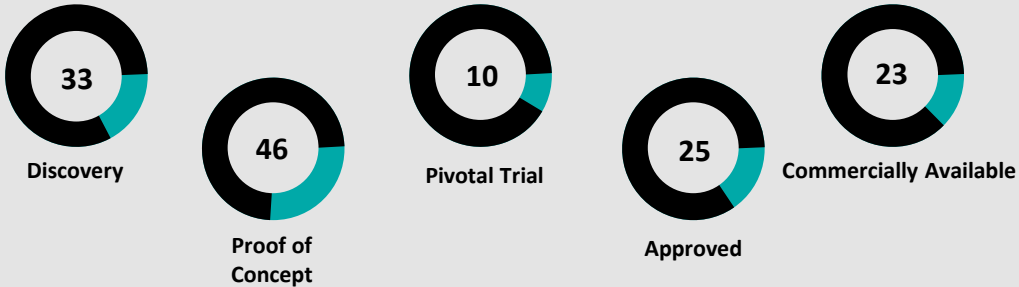
- There were 137 digital therapeutic (DTx) apps, games, and virtual reality in any phase of development as of June 2021
- ~ 25 DTx products have been granted market authorization and another 23 are commercially available, with indications predominantly in the mental health and behavior modification areas
- An additional 89 are in earlier stages of development and evidence generation with a focus on neurologic and psychiatric conditions

Latest first of its kind digital therapeutics that got FDA approved

Happify Health launched Ensemble, the first and only transdiagnostic prescription DTx for the patients who have **Major Depressive Disorder (MDD)**

happify health

FDA granted AppliedVR approval for first virtual reality therapeutic to treat **chronic low back pain**

appliedVR

Nov 2021

Jul 2021

Oct 2021

Limbix

Limbix launched SparkRx, the first digital therapeutic for adolescents with **symptoms of depression**

Nov 2021

metaMe Health

metaMe Health's Regulora is the first FDA-authorized treatment of any kind specifically for **abdominal pain** associated with irritable bowel syndrome (IBS) in adults

Sources: MedCityNews, businesswire, metaMe Health, IQVIA

6. Gamification in healthcare is gaining momentum as it is making difference in the modern healthcare

The market valuation of healthcare gamification will cross $65 Bn by 2027 with a significant portion of serious games*. The serious games segment in the healthcare gamification currently account for USD 2.5 Bn

Jun 2020
US FDA approved first game-based digital therapeutic to improve attention function in children with **ADHD**, for the EndeavorRx to Akili Interactive

Dec 2020
Novartis inked a deal with Tilak Healthcare to distribute its **eyesight monitoring** game globally

Aug 2021
Magellan Healthcare launches clinically proven video game solution to support **emotional health** for youth

Oct 2021
Tilak Healthcare secures $8 Mn to gamify the monitoring of **chronic eye diseases**

Nov 2021
Specially designed video games on the platform, called Thymia , uses neuropsychology, linguistics, and machine learning to detect signs of **depression**

Gamification in action

happify

- The app uses gamification to provide scientifically backed tools that enable cognitive behavioral therapy
- It claims that more than **86%** of its users report feeling happier within two months of using the app

mySugr

- MySugr developed an app aimed at helping users cope with diabetes
- MySugr app improved blood sugar testing frequency by **10-20%**. As a result, app users managed to decrease their blood sugar levels by **0.4-1.1%**

HOPELAB

- Re-mission is a set of online games developed by HopeLabs to help children with cancer
- The company claims to have helped over **135,000** cancer patients adhere to their treatments

Future Outlook

Real-time data analytics, mobility, cloud services, and social media platforms provide the basis for quickly and relatively inexpensively accelerating adoption and proliferation of gamification tools

Gamification in health care is in its early days, but growing in popularity. Interactive patient education tools – including video games — are being used in hospitals, particularly to help patients with chronic diseases

*Serious game segment refers to videogames that are not created for the sole purpose of entertainment

7. Digital Biomarkers: Transformation through Novel Evidence, Deeper Insight and Empowering Engagement

Opportunities for Digital Biomarkers Span the Entire Patient Journey

| Healthy | Pre-diagnosis | Diagnosis | Treatment | Monitoring |

Prevention
Facilitate healthy lifestyle and 'good' behaviors

Precision diagnosis
Diagnose patients accurately, timely; Predict clinical progression trajectory

Personalized care delivery
Tailor setting of care delivery to patient's individual needs

Early screening
Detect early disease or risk factors in seemingly healthy individuals

Personalized treatment
Identify patient subgroups of high responders, best AE profile; Tailor therapy to patient's individual needs

Remote engagement
Monitor treatment response to inform adjustments to therapy; Drive 'good' behaviors for high patient adherence & compliance Support patients throughout

The rise of Digital Biomarkers

- Advances in sensor technology embedded in (mobile) digital devices are enabling new functionality for the remote capture of novel digital measures

- Growing connectivity allows the consolidation of digital measures captured for each patient across different collection points, and over time, for a comprehensive, longitudinal digital health footprint

- Increasingly powerful analytics, including AI and machine learning, are enabling the handling of large, even unstructured data sets to derive novel insight

Source: IQVIA

8. With the rise in tech advancements, wearables are evolving as outstanding health monitoring devices

With the introduction of sensors, miniaturized electronics, and system packaging for home sleep monitoring, wearable technology has advanced significantly with market size of $40 Bn in 2021

First of its kind wearable devices are flooding the market

AcuPebble, a FDA approved device that can **detect Sleep Apnea**	**Reliefband Sport**, a New wearable therapeutic device developed **to combat nausea**	**Philips Healthdot** is one of the **first biosensors** that sends vital data to the hospital without any hub or mobile phone	Natural Cycles receives FDA clearance for world's **first birth control wearable** Oura Ring	First Assist Model FA-1, **First wearable vein dilation device**, receives FDA breakthrough device designation

Future landscape for using wearable technology in healthcare

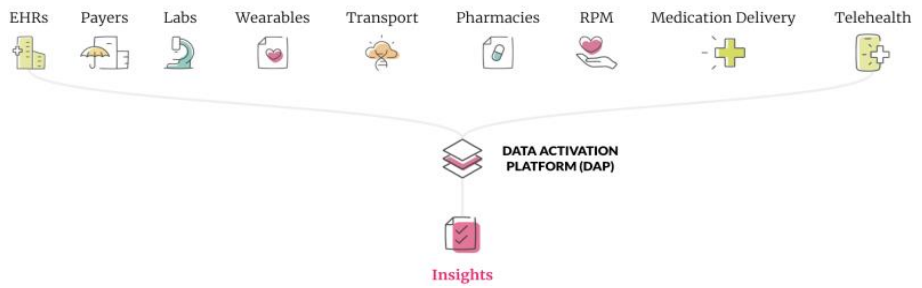The growth of wearables coupled with a shortage of skilled caregivers has led to an emergent need for automatic, real-time personalized designs for in-place healthcare. The goal is to shift to more personalized care that empowers patients to be engaged in self-care, helps caregivers better support their loved ones & allows providers continue providing high quality care for the patient's needs at a lower cost

9. Tech is the savior in the healthcare interoperability journey

High influx of regulations on one hand and healthcare companies not that ready on the other hand has eventually led to a big void that now tech providers are filling with their innovative offerings

FHIR-enabled Data Activation Platform

EHRs   Payers   Labs   Wearables   Transport   Pharmacies   RPM   Medication Delivery   Telehealth

DATA ACTIVATION PLATFORM (DAP)

Insights

Oracle-Cerner Deal could address a major challenge in healthcare, that of datasets that can't communicate with one another

4medica, and Smile CDR have partnered to enhance the quality of health data available to providers and payers

Next Level Urgent Care will implement Allscripts Touchworks EHR platform and Microsoft Azure in an effort to enhance interoperability

Google launched its Cloud Healthcare Interoperability Readiness Program to help healthcare clients evaluate and comply with the interoperability rule
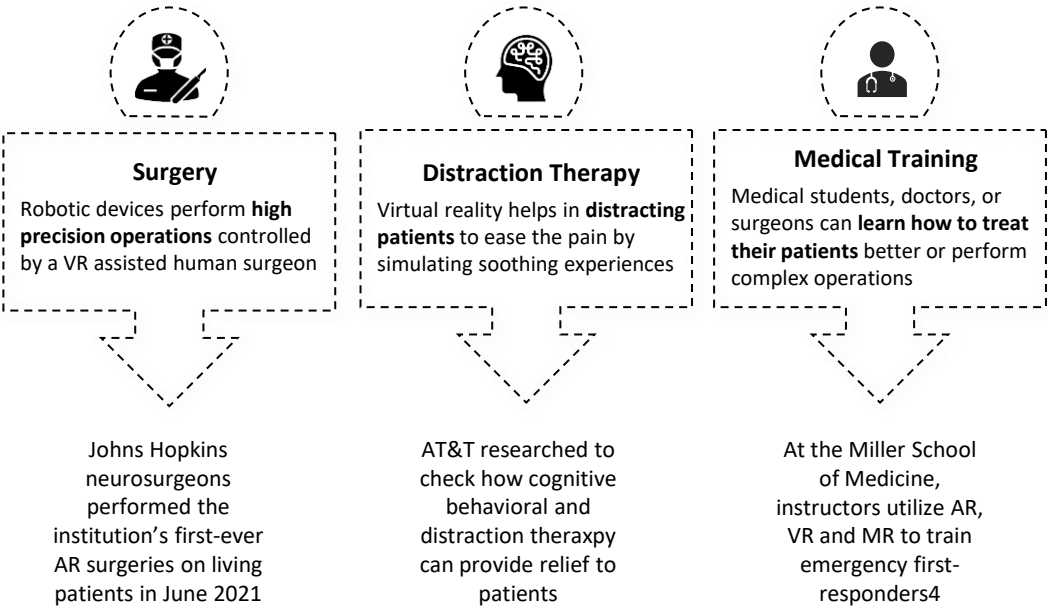

A library of industry-tested, ready-to-use integrations, interfaces, and customizable tools in a convenient SaaS offering to improve data management and deployment speed, while offering better interface visibility and control

Unified Patient Record

A comprehensive unified patient record built from multiple healthcare data sources (clinical, claims, labs, pharma and others) and driven by advanced EMPI to present a whole-person view

Health information exchange (HIE)

Allowing doctors, nurses, pharmacists, other health care providers and patients to appropriately access and securely share a patient's vital medical information electronically

Plug-and-Play Data Integrations

Prebuilt integrations to most health IT systems and vendors—EHRs, payers, HIEs, pharmacies, labs, and partners

Healthcare Data Repository

It enables health information exchange, clinical decision support, quality measurements, and new application development for authorized user

10. Behold the Metaverse: Healthcare is on the verge of disruption

AR/VR technology is providing comfort across healthcare

Surgery
Robotic devices perform **high precision operations** controlled by a VR assisted human surgeon

Distraction Therapy
Virtual reality helps in **distracting patients** to ease the pain by simulating soothing experiences

Medical Training
Medical students, doctors, or surgeons can **learn how to treat their patients** better or perform complex operations

Johns Hopkins neurosurgeons performed the institution's first-ever AR surgeries on living patients in June 2021

AT&T researched to check how cognitive behavioral and distraction theraxpy can provide relief to patients

At the Miller School of Medicine, instructors utilize AR, VR and MR to train emergency first-responders4

First of its kind wearable devices are flooding the market

- NVIDIA is attempting to innovate in the metaverse with its Omniverse platform
- An easily extensible, open platform built for virtual collaboration and real-time physically accurate simulation

- Microsoft Mesh, a holoportation and mixed reality platform making digital connections life-like
- This complements Microsoft's Hololens that is already been explored in surgical case-studies and as a means to provide medical care remotely

- Facebook/Meta recently demonstrated its haptic glove technology, allowing the user to experience the sense of touch in the virtual world
- The demonstration shows users interacting in the virtual space and even playing precision and dexterity heavy games such as jenga
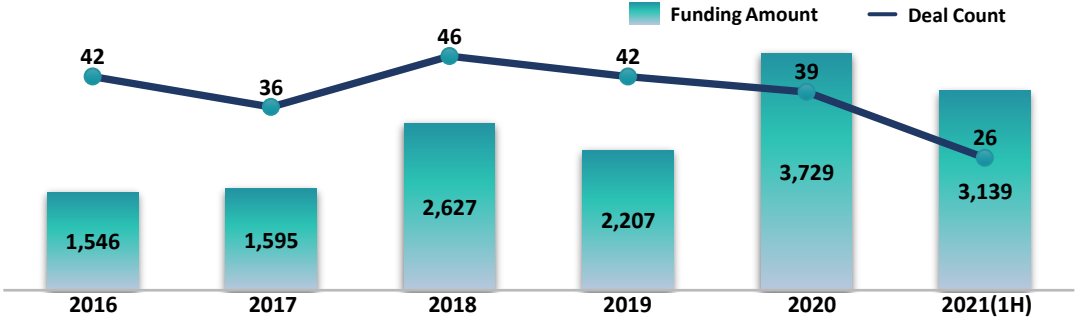
Some of the other

Health Tech

trends of 2021

The Big Tech is betting big into the healthcare businesses

Big tech's investment across healthcare ($Mn) 2016 – 2021(1H)

$ 6.8 Bn

Big tech has invested in healthcare deals since the start of 2020

Funding Amount — Deal Count

Year	2016	2017	2018	2019	2020	2021(1H)
Deal Count	42	36	46	42	39	26
Funding Amount	1,546	1,595	2,627	2,207	3,729	3,139

Facebook
- Launched a **preventative health solution** in the US and a **provider search tool** to help users find affordable care in their communities
- Meanwhile, the company's Oculus team is working with teaching hospitals to deploy VR-based medical education tools

Apple
- Updated Watch and iOS to capture even more **health metrics**, including blood oxygen level, and created a data **sharing feature so users can share medical data with providers**
- The company also launched a subscription-based streaming platform with **exercise classes**

Microsoft
- Dropped **$19.7 Bn to acquire Nuance**, a leader in conversational AI for healthcare
- The company also launched **Microsoft Cloud for Healthcare**, a tech stack for enterprise healthcare organizations that combines AI, automation, and low-code app development

Google
- Launched a camera-based search tool that uses **AI to diagnose skin conditions**
- The company also launched an **EHR search** solution for providers, an **interoperability solution** for payers, and a return-to-work test and trace program for employers

Amazon
- Launched **Amazon Care, Amazon Pharmacy, and AmazonDx** in the past year, all consumer-focused healthcare services. The company also unveiled AWS for Health

Source: CBINSIGHTS

Big Data Analytics is streamlining the humongous data produced in healthcare

The healthcare industry produces zettabytes of data taken from EHRs, medical imaging, medical devices, and so much more that big data is able to aggregate, organize, and manage to improve the entire healthcare ecosystem

Baxter, a medical products company, extends its multiyear agreement with Amazon so it can continue to use the Amazon Web Services cloud as a foundation for digital transformation

Olive unveiled a strategic partnership with Amazon Web Services to use AWS' cloud computing to make its healthcare platform faster and more affordable for 950 hospitals in 40 states

As part of a new multiyear strategic partnership, HCA will be using Google Cloud's healthcare data products—such as the Google Cloud Healthcare API and BigQuery—to support custom-built analytics tools for use in various settings

Diagnostics
Data mining and analysis to identify causes of illness

Preventative medicine
Predictive analytics and data analysis of genetic, lifestyle, and social circumstances to prevent disease

Precision medicine
Leveraging aggregate data to drive hyper-personalized care

Medical research
Data-driven medical and pharmacological research to cure disease and discover new treatments and medicines

Reduction of adverse medication events
Harnessing of big data to spot medication errors and flag potential adverse reactions

Cost reduction
Identification of value that drives better patient outcomes for long-term savings

Population health
Monitor big data to identify disease trends and health strategies based on demographics, geography, and socio-economics

Chronic disease management is a key area for Big Data

Healthcare providers who continue to invest in big data analytics may be able to position themselves for success as the availability and analysis of large volumes of patient data becomes increasingly central to the complex, never-ending task of chronic disease care

Other Health Tech Trends

1. Increased focus on the "On-demand healthcare"

2. Healthcare nudging technologies / programs are gaining traction

3. Cloud computing to store immense medical data at low costs

4. 3D bioprinting to study terminal diseases

5. Nanomedicine informatics to integrate big and composite medical datasets

6. Mobile health clinics are improving access to care in healthcare

7. Technology is narrowing down the taboo of mental health

8. Digital is reshaping US health insurance industry

This report has been authored by Healthark Insights

Authors:

Purav Gandhi
Founder, Healthark Insights

Ritu Baliya
Manager, Healthark Insights

Riya Doshi
Senior Consultant, Healthark Insights

Nitish Gupta
Consultant, Healthark Insights

Contributors:

Pranav Mangal, Consultant, Healthark Insights

Vipul Mehta, Consultant, Healthark Insights

Designed by:

FiMarkCo Services