



# HEALTHCARE **Digital Tools**

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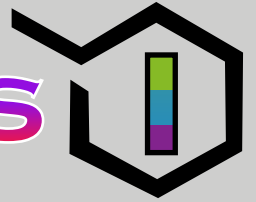
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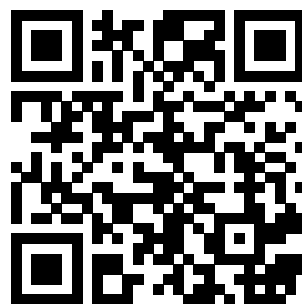
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# HEALTHCARE DIGITAL TOOLS

The future of health is the utilization of digital technology to complement clinical practices, yet not replace them. Healthcare workforce will have access to advanced digital tools in both the public and the private sector. Those technologies are designed to inform, support the healthcare environment, and, in parallel, offer quality to primary care.

## SPECIFIC IMPROVEMENTS IN HEALTHCARE

Recent developments have surfaced in the following areas: knowledge resourcing, decision-support tools, patient and doctor communication practices, and patient management. Furthermore, training programmes and educational digital tools such as e/mLearning, knowledge sharing, and academic networks, reinforce medical staff skills<sup>1</sup>.

Digital health continues to stay ahead of the traditional systems by empowering individuals in relation to their capacity to manage their own health.

Chronic health conditions and increasing aging population are the two main factors that put an overwhelming cost burden in healthcare industry. The solution to this challenge is now delivered by innovative digital tools, such as RPM (Remote Patient Monitoring) devices, telehealth platforms, PERS Health Insurance Program (PHIP), and mHealth applications which all manage to keep full record of patient profiles and, eventually, provide better treatments.

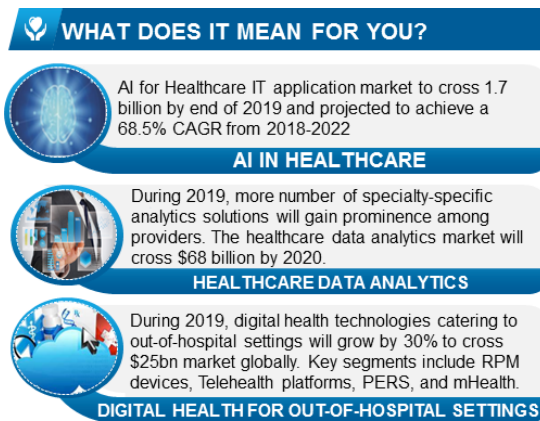
It is expected that by end of 2019 digital health technologies will be enabling enhanced hospital setting facilities that will grow by 30% to cross USD 25 billion market globally<sup>2</sup>.

**80% of global data**

WILL BE UNSTRUCTURED

BY 2025





**Fig 1** Artificial Intelligence (AI), Big Data Analytics, mHealth & Wearables change the future of Healthcare. Forbes.com. (2019).  
 Top 8 Healthcare Predictions



A large volume of information can be processed by big data using a non-conventional way. Effective planning and monitoring are achieved by Big data analysis, so amounts of information in real time can be implemented to patient management. Big data also includes data storage, data processing, data visualization, and data sharing. The medical information, which includes medical reports, is aiming at protecting both sensitive medical digital and traditional information.

Electronic Health Record (EHR) or biomedical data are increasingly sourced by remote patient monitoring integrated with home healthcare and smart devices. EHR provides real-time massive data which are exchanged through digital networking platforms. Public-Private Partnership (PPP) stakeholders' databases is a strong example of medical data storing and sharing, achieved by such a technology<sup>3</sup>.

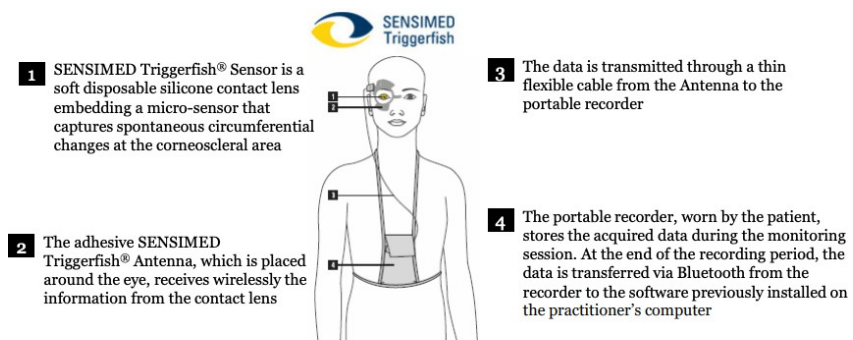
Medical organizations use unstructured data in order to analyze their knowledge base. Because such data cannot easily be stored, it is a real challenge to search, edit, and analyze it. By 2025, 80% of global data will be unstructured. The new wave of unstructured data is increasingly stemming from sources outside the organization, usually in the form of social media data, or real-time streaming data, such as IoT (Internet of Things) 'smart' devices or other technologies. If the medical organizations try to manage unstructured data now, this issue is bound to get worse over time. Traditional unstructured data storage consists of text documentation and other file types, including photos and audio files.

Patient engagement strategies assist individuals to make informed healthcare decisions and is achieved by organizations that understand how consumers use digital technologies. These engagement strategies, in turn, could help healthcare organizations improve effectiveness, efficiency, and value in service delivery<sup>4</sup>.

## SENSIMED TRIGGERFISH TECHNOLOGY

This is a non-invasive soft contact lens-based solution, developed by Sensimed AG, a Swiss company. This innovation aims at revolutionizing glaucoma management by providing an automated recording of continuous ocular dimensional change over 24 hours. The SENSIMED Triggerfish has been approved by the US Food and Drug Administration (FDA) in 2016. The device is registered in Japan at the Pharmaceuticals and Medical Devices Agency (PMDA) in 2018. The company's focus is to expand the knowledge of how this individual data can best be used in the clinical setting to deliver customized treatment.

The 24-hour profiles are being centralized on a registry together with patient treatment information to identify pathological patterns that can be used to differentiate indicative pathologies on every patient, based on their specific needs and, therefore, achieve a personalized treatment while assessing efficacy<sup>5</sup>.



- Provides information on continuous natural changes to the eye to ophthalmologists including intraocular pressure
- Allows improved glaucoma management and faster intervention



**Fig 2** Case Study: SENSIMED Triggerfish® – Smart contact lenses to tackle glaucoma. Amazon Web Services, Inc. (2019). Waters Case Study – Amazon Web Services (AWS).



## AWS PROFESSIONAL SERVICES

AWS Professional Services is really ahead of its competition in fielding consultants with life-sciences expertise who understand the technology and the reality of operating in the regulated world. The company's innovation is a new complaint management procedure that enables better decision-making process with regards to care. As a result, the medical staff will have greater control over Big Data management. The Australian Government will increase funding for aged care by USD 5 billion over five years in order to introduce a performance rating for residential aged care service providers against new quality standards.

## WATERS CORPORATION'S EMPOWER CHROMATOGRAPHY DATA SOFTWARE (EMPOWER CDS)

The company uses digital technology to innovate CDS to achieve potency and purity of materials for operations of pharmaceutical companies. To be more precise, CDS solutions analyze, store, and share the huge volumes of generated chromatography data. Worldwide laboratory-dependent organizations adopted Empower Software for data integrity, repeatability and accurate reporting. Waters attain a good market leading position due to such software<sup>5</sup>. Patient genetic data is a complicated matter. Clinical trials support large and complex information and cannot be supported by conventional methodology (graphs, charts).

Instead, research organizations are beginning to intelligently apply data integration tools that enable scientists to explore and interact with aggregate data. A new level of discovery with in-depth insight would never have been achieved through a traditional review of data. Advanced tools and rendering data in this expanded capacity are challenges that require the deployment of well-established visual analytics theories and sophisticated software to obtain critical analysis. Taking into consideration this clinical information, the scientific committee controls more effectively the pharmaceutical doses that are adjusted to risk-based monitoring.



## INCORPORATION OF THE REAL-WORLD DATA INTO TRIAL PROTOCOLS<sup>6</sup>

The advancement of digital biomarkers from social media, wearables, electronic health records (EHRs), and smartphones has transformed the healthcare sector for more than 20 years. Such technologies play pivotal role in real-world data protocol design. There has been huge focus lately on tracking social determinants of health. For example, Stanford has recently outlined its 400,000- person Apple Watch heart rate study<sup>4</sup>.



## VIRTUAL TRIALS ARE THE FUTURE<sup>6</sup>

There was an interesting panel at CNS (Central Nervous System) that examined all of the different virtual trial models at play. Virtual trials support innovation. Leaders of such innovation include Science, Medable, Thread, and Medidata, all of which has brought new technologies in the market. Technology platforms allow trials that operate via a single, virtual, personal site or through telemedicine, and even in-home monitoring via BYOD (Bring Your Own Device). Most of the top five CROs work according to these virtual trial operations.

## APARITO COMPANY

Aparito uses wearables and disease specific mobile applications, so that patients can be monitored out of the premises of the hospital. Clinical trial process is revolutionized, as the company delivers meaningful, relevant, and real-time data between patients and doctors for better diagnosis, treatment and drug development. The company's aim is to evolve the "orphan" drugs that are intent to cure rare diseases and currently develops the necessary equipment to support this innovation<sup>7</sup>.

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