The future of healthcare

Innovation in health-related products, services and tools, driven largely by digitisation, will prove to be a game-changer in the healthcare ecosystem of tomorrow

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Every crisis brings out unexpected heroes with solutions that have a far-reaching impact on society. As we battle for survival in the world of Covid, accelerated drug discovery made possible by mRNA (messenger ribonucleic acid) and large-scale digitisation in healthcare have emerged as saviours today. Katalin Kariko, a Hungarian immunologist, defied all odds in the early years of her career to keep her mRNA research alive and, as a result, gave the world one of the greatest immunology discoveries. Today, mRNA-based vaccines are the primary weapon in our fight against the global pandemic and its success on Covid-19 has prompted others to pursue it as a treatment for a variety of diseases.
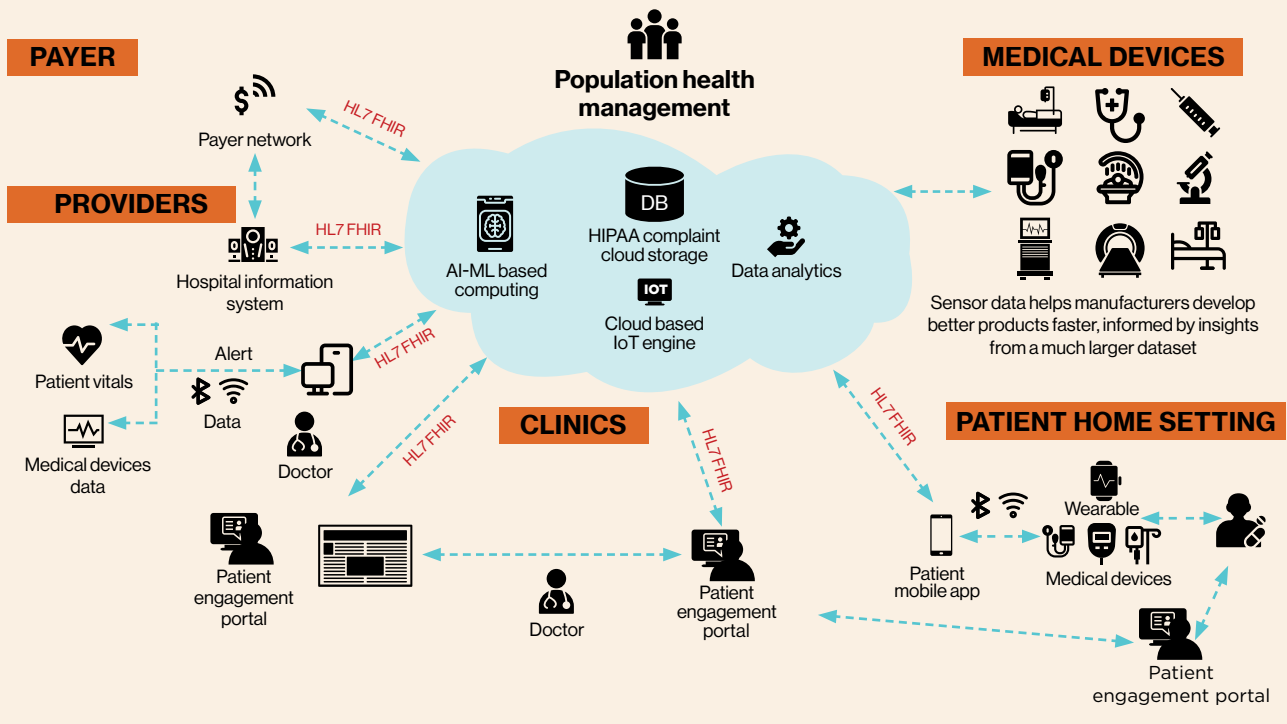
The success of new age medicine and immunotherapy such as mRNA is based on large-scale digitisation of medical data, which has accelerated over the last decade. Scientists and immunologists all over the world have benefitted from standardisation of methods and procedures, and are now able to cooperate by exchanging genetic information of SARS-CoV-2 strains in order to cope with its rapidly mutating variants. The power of Big Data and analytics has been evident in this pandemic.

Genomics and mRNA-based vaccine research have become highly efficient thanks to a data-centric collaborative approach, which could speed up the process of developing a life-saving vaccine and produce it in record time. As of December 2020, well over 100,000 whole-genome sequence data and associated data have been collected and shared to facilitate in finding the cure. Advanced

Next generation collaborative healthcare data management

PAYER

Payer network

PROVIDERS

Hospital information system

Patient vitals

Alert

Data

Doctor

Patient engagement portal

Population health management

AI-ML based computing

DB

HIPAA complaint cloud storage

IOT

Cloud based IoT engine

Data analytics

HL7 FHIR

CLINICS

Doctor

Patient engagement portal

Medical devices data

MEDICAL DEVICES

Sensor data helps manufacturers develop better products faster, informed by insights from a much larger dataset

PATIENT HOME SETTING

Wearable

Patient mobile app

Medical devices

Patient engagement portal

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analytics and technologies enabled by artificial intelligence (AI) have made a wealth of life-saving data and therapeutic protocols accessible to the most vulnerable people at the right time.

DIGITAL TRANSFORMATION IN HEALTHCARE

Let's take a brief look at two major aspects of these change agents in healthcare's digital transformation: connected healthcare and data management. Although innovations such as telehealth, remote patient monitoring and m-Health continue to grow at an exponential rate, healthcare data management, interoperability and efficient usage remain critical for enhancing delivery quality and reliability while optimally using resources for effective patient care.

AI-assisted diagnosis: AI is empowering a multitude of diagnostics and personal care products, thereby freeing up clinicians' time and resources and enabling them to focus on more acute areas where needed. It is projected that 1.5 million to 2 million hours a year will be freed up due to AI-assisted diagnosis, resulting in significant cost savings and an improvement in the accuracy of diagnosis and performance across the board. However, developing an AI-based clinical decision support system requires a deep understanding of both clinical and non-clinical aspects of the system.

Tata Elxsi has invested in people, processes and infrastructure to support AI product lifecycle based on Good Machine Learning Practice (GMLP) that will determine

how data needs to be curated and statistics needs to be interpreted. This aligns with Good Clinical Practices (GCP) and Good Laboratory Practices (GLP) required to build robust clinical decision support systems.

Consumer-centric integrated health system: The healthcare industry cannot afford to remain fragmented and isolated, as is evident from the mRNA-based vaccine programme. The key is to securely integrate interoperable healthcare systems and research, for which several collaborative networks and frameworks are being developed. Tata Elxsi is implementing secure open systems to enable sharing of data within a hospital, across hospital networks, and even countries.