Empowering National Digital Health Mission with data and technology

Faced with the resurgent wave of the pandemic, our belief in the benefits and positive externalities accruing from a robust health infrastructure are affirmed. The existing policy framework for healthcare is multidimensional including focus on - capacity building, strengthening primary healthcare, reducing non-communicable disease burden, health insurance, research and investment. A new initiative in this sphere - National Digital Health Mission, aiming to address the challenges within healthcare using data and technology, is a step in the right direction. The scheme envisages to create a unique health ID for each citizen and seamlessly integrate them with the health infrastructure.

A few data and technology centric solutions can further add to the scope and strategy of this mission and enable us to converge to the desired health outcomes. Creating electronic health records (EHR) can offer a good starting point by weaving gigantic quantum of data like comorbidity history, medical records, doctor visits, diagnosis and procedure profile, medication prescribed, etc. using the unique patient identifier (health ID). This will help to create a 360-degree patient profile. The database will be anonymised and encrypted to unearth analytical insights for different population cohorts and geographical regions. Unsupervised machine learning algorithms like image recognition (like discerning patterns and medical histories from CT scans, X-rays, etc.) and natural language processing (say to extract key phrases from medical prescriptions) can be deployed to create structured data sets from the rich pool of unstructured data available in healthcare (like medical prescriptions, pharmacy billing, scans, etc.).

The metadata will enable feature profiling of patient cohorts and charting their longitudinal journeys across different lines of treatment (like diabetes, cardiovascular conditions, cancer, etc.). Specific features of the population (characteristics like age, region, comorbidity, etc.) can enrich the advanced machine learning prediction algorithms to identify precise points of care management. Customised intervention will lead to enhanced quality of care and improved health outcomes. For instance, historical data on images from CT scans can indicate the progression of tumour in a certain population cohort and once fed into deep learning algorithms (like convolutional neural networks), can predict the survival rate under different lines of treatment.

Taking this exercise to the next level will include geospatial profiling, to design evidence-driven policy for local health administrators. At a district level, the potential of EHRs can be tapped by analysing health/comorbidity profile and disease burden and consequently providing customized infrastructure/capacity support at primary health care level. An illustration of data driven local health management from the current wave of pandemic is vaccine inventory management. Metrics

like population density, age profile and distance can be fed into geo-spatial algorithms to ensure resource optimization, uninterrupted vaccine supply chain, optimal selection of vaccination centres and alignment of frontline health workers in different parts of the district. Clustering algorithms can also be deployed to determine the spread and intensity of disease burden across various population cohorts in a district to ramp up primary healthcare capacity as per the need of the area. Further, real-time dashboards (hosted on web and mobile versions) can equip local healthcare administrators with easy to interpret and prompt visualisations to facilitate customised delivery of care.

Creating a digital footprint of a citizen's health profile will prevent duplication in diagnosis and testing and the records can be seamlessly exchanged between different points of care. This will also help in lowering costs and providing a continuum of care to patients.

Healthcare delivery can be integrated with the credible Arogya Setu app and its growing base can be utilized to expand its existing functionality, thereby, promoting wellness management and patient medical adherence. A plethora of services like proactive follow-up care, health messaging, lifestyle advocacy, finding nearby primary /community health centres, appointment scheduling, and telemedicine can be integrated in the app.

These applications are some of the solutions that real-time data and technology can offer in the sphere of healthcare. As nations across the world embrace cutting edge innovations to find novel solutions to long tail events like the Covid-19 pandemic, we should supplement our existing strategy within healthcare with upgraded data/technology to remain ahead of the curve. Data driven analysis will help address the diverse health needs of our states/districts and offer tailor-made solutions.

The outcomes, to list a few, will help in further enhancing health and productivity of our population, reducing their disease burden and creating efficient healthcare delivery.

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Disclaimer: Views expressed are personal.