



## *AI Strategy for Health*

*The problems in health are too big and the potential AI offers is too enticing to not try*

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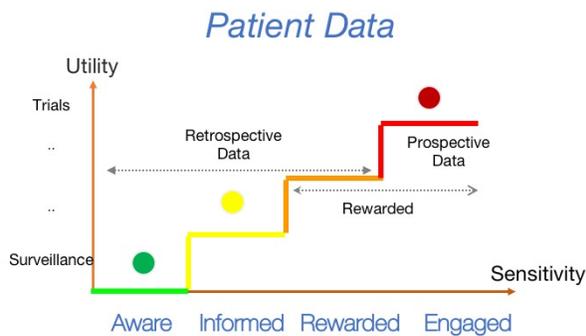
The opportunities for countries, especially in the developing world, to create an AI centric health ecosystem is enormous. Healthcare will benefit from innovative digitization with an economic model built around data and services. A data-transparent environment can provide tremendous cost-efficacy and health benefits to society by enabling AI-powered actionable foresights.

The design considerations for such an ecosystem focuses on all stakeholders such as Patient, Healthcare Provider, Insurance Provider, Pharmacy, Laboratories, Research, Device Makers and Government and Social Organizations. These stakeholders provide inputs, generate outputs and have some

expectation from each other. The needs of the stakeholders are examined within the context of four lenses: Data, Incentives, Trust and Resources to build a framework. The resulting framework ought to support trust, regulatory-compliance and incentives for stakeholder participation.

An AI-centric ecosystem requires a common digital backbone. It relies on Artificial Intelligence to provide insights & uses Blockchain Technology to ensure security and trustworthiness. Data is central to any AI system. The AI-centric health ecosystem has three parts: Capture, Analyze and Act. The discussion here is limited on how to capture, analyze and act on health data

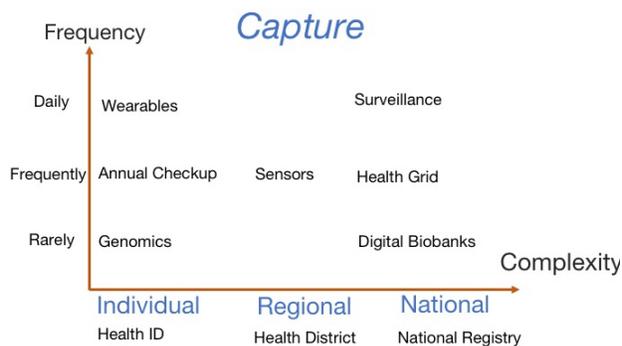
Capture of huge amounts of data is critical for an AI system. Sharing of patient-data with other groups is at the patients' discretion (achieved through consent2share platforms). Where patients have opted for data sharing they get incentives in terms of tokens. These tokens are used for various purposes such as for reducing insurance premiums. To ensure transparency, patients are notified when their data is accessed.



To illustrate data categorization, we take the example of Patient Centric View. Data is categorized based on sensitivity and its value: Aware (Patient Name and Location), Informed (Vitals and Prescription), Rewarded (X-rays and Ultrasounds) and Engaged (Blood tests for Clinical Study). As the sensitivity of data increases, the more useful or valuable it becomes; incentives also increase proportionately.

Data at this stage includes personal identifiers; it resides with the primary care or the laboratories conducting the tests. It is worth noting that there are four ways to apply data privacy: Anonymize, obfuscate (add noise), smash (split learning) and encrypt (homomorphic encryption). Smash (distributed deep learning proposed by MIT) is recommended as it is truly compatible with AI. It ensures that data does not contain any personal identifiers, nor can they be identified through other means.

Patient's data is viewed at three levels: Individual, Regional and National level.



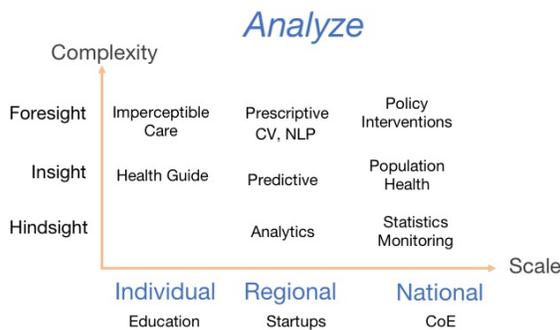
At the individual level, it is recommended that there be a unique Health Id for patients. Individuals use one of the national identifiers specified in the National Policy to enroll into the National Healthcare system. The system generates a unique Health Id. This unique id is used across all services such as primary care, labs, payment systems. A patient's health record appears seamless to them; no matter which primary care they visited or the five radiology labs they went to. Their payment information is tied to these visits using the health id.

Aggregated data at the district level is indicative of the overall health of the district. At the local level, It helps with decisions that are data-driven in nature. It makes available different statistics on patient data. This data is also used for population wide studies and research helping bring about transformation.

A National Health Data Registry is the underpinning of health AI strategy. It is populated with patient-data over and above data from various stakeholders. Patients own the data they contribute but the registry is administered centrally.

The main policies in the analyze phase revolve around growing the talent and building the infrastructure at scale. Fig X indicates that when analysis is not too complex one relies on hindsight that really stems from past experiences. When some statistical analysis is done on the data available, the complexity somewhat increases but it also delivers insights. Insights are for the present, for the here and the now.

When machine learning algorithms are applied what is generated is foresight; one is able to predict what may happen next.



At the individual level, contests and awards help identify talent for AI. At the regional level there is effort by the local government to encourage the creation of Technology Hubs that provide state-of-the-art platform to help incubate a startup ecosystem. Technology hubs could be in the form of public-private partnerships. Such a technology hub attracts entrepreneurs, investors, incubators, accelerators, researchers and academicians to collaboratively launch innovative companies. These hubs use the infrastructure that is made available nationally.

At the national level there is an institutional framework that helps drive AI in a sustainable manner. The center(s) of Excellence is overseen by the government and includes members from technology companies, academicians and subject matter experts. Different groups within the CoE are tasked with focusing on specific aspects of AI (Cognitive AI, Computer Vision, Natural Language Processing, designing algorithms etc.). The knowledge gained is shared across the board, shortening the learning curve for all. Grants from the government or public-private equity is provided to promote research and development.

We consider three types of Actions using health data capture and analysis: Alert, Assist and Change. These actions are at an individual level, regional level or national level.



At the individual level it is important that the patient be engaged. One form of engagement is at the physical level for instance patients visit clinics for preventive care or take medicines in a timely manner. At the digital level, there are friendly Apps that keep the patients further engaged. There are online surveys where patients rate the doctor or provider. A good primary care proactively reaches out to registered patients.

At the local level, AI is used effectively to build foresight. In healthcare shortage of labeled data and computational resources is a critical issue while developing machine learning algorithms. To address the issue of scarcity in labeled data Split Learning (developed by MIT) is recommended.

At the national level, coordination happens at the Health Ministry level. This includes coordination with foundations, CDC (Center for Disease Control) and WHO. For example, several national and international agencies may be interested in evaluating the efficacy of a shorter TB vaccination regimen and may want to conduct a trial across one or more regions.

The problems in health are too big and the potential AI offers is too enticing to not try. It is not easy; but not impossible to achieve. No longer can we say, that we tried everything to help the patients and the underprivileged. The time to do this is now. In today's interconnected world, the emerging economies that adopt AI for Health will be at the forefront of transforming health for the whole world.

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The original paper is published at [ResearchGate.Net](https://www.researchgate.net).



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Alka Asthana (CEO, DeZaView.ai), works at the intersection of AI Product Strategy & AI Policies. Her focus is an AI that can deliver, perform, sustain & endure the written & un-written social contracts with all stakeholders. The key at this intersection is the ethics & integrity of AI.