

## EDITORIAL

### Healthcare Analytics: Applications and Challenges

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Present day decision making in healthcare has become a data-intensive process leading to the rise of healthcare analytics. These analytics involve the integration and analysis of data collected from multiple heterogeneous sources including biomedical data (electronic health records), experimental (R&D) data, patient lifestyle and behavior data (store records, social media, wearable electronic devices etc) and financial data. Healthcare analytics is further being transformed by the application of current - omics technologies (genomics, epigenomics, transcriptomics, proteomics, metabolomics, pharmacogenomics etc), shifting healthcare to a system that is “predictive, preventive, participatory, and personalized”, referred to as the P4 medicine paradigm. The omics revolution is generating a huge amount of data that needs to be collected, stored, transformed, analyzed and ultimately delivered in a format that is understandable to the clinicians. Properly applied, healthcare analytics provide actionable insights that can lead to improvement in healthcare management and delivery, clinical outcomes, health policies and allocation of health resources to communities in need.

Medical institutions worldwide are facing many challenges. There is a shortage of trained human resource, patients are more demanding and regulators are becoming more stringent. The healthcare systems are under pressure to provide better and safer healthcare that is also more cost-effective. This is leading to the development of a whole new healthcare analytics industry to capture, store and analyze big data for healthcare providers, health system leaders, and those in government health and human services to improve healthcare delivery and outcomes. A report by McKinsey Global Institute published in 2011 estimated that if US healthcare were to use big data creatively and effectively, the sector could create more than \$300 billion in value every year.<sup>1</sup>

While innovative new technologies and platforms are making it possible to capture vast amounts of information of individual patient over a large timescale, a large amount of data remains underutilized and wasted. It is estimated that healthcare providers discard around 90% of the data that they produce.<sup>1</sup> One of the greatest challenges in healthcare analytics is harvesting the data from multiple complex and heterogeneous sources spread across different healthcare systems, health insurers, scientists, government bodies etc. and transforming it to generate meaningful information. Moreover, the personal and financial data and medical records of patients required to contribute to effective analytical platforms may be confidential and private and therefore inaccessible. Hospitals are also reluctant to share their financial and clinical audits. There is the issue also of ownership of the data and in many countries patient data is legally possessed by the patient. Even so the healthcare industry, slow to transition towards data mining and IT solutions, has now begun to adapt to the digital data age. Algorithms for collecting, compressing, anonymizing and sharing medical data are being developed by different groups in addition to various platforms specific to healthcare analytics.

The implementation of healthcare analytics, particularly in developing countries like Pakistan where most healthcare facilities lack even the most basic form of EHRs is a formidable challenge. Pakistan has a robust IT community with a special interest and investment by the government sector in IT and Artificial Intelligence platforms. Pakistan government last year announced seed money of Rs 1.1 billion, to carry out a three-year project on AI, through the Higher Education Commission to be conducted by six universities. One of these projects, related to medical imaging and diagnostics, is a step in the right direction. However, we still have a long way to go if we are to reap the benefits of healthcare analytics in Pakistan. There is a need for the involvement and commitment of all stakeholders including healthcare facilities, academicians, researchers and industry etc to contribute to this endeavor. There is no shortage of qualified human resource in the country. All that is required is the will of the health sector to invest in this golden opportunity for healthcare analytics to play a role

in improving the delivery of cost-effective care, save lives and define health policies in Pakistan.

*Editor-in-Chief*

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