

- Paper title - Big data analytics in healthcare: promise and potential
- Abstract - To describe the promise and potential of big data analytics in healthcare. The paper describes the nascent field of big data analytics in healthcare, discusses the benefits, outlines an architectural framework and methodology, describes examples reported in the literature, briefly discusses the challenges, and offers conclusions. The paper provides a broad overview of big data analytics for healthcare researchers and practitioners. Big data analytics in healthcare is evolving into a promising field for providing insight from very large data sets and improving outcomes while reducing costs. Its potential is great; however, there remain challenges to overcome.
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- Link to the paper - <http://hissjournal.biomedcentral.com/articles/10.1186/2047-2501-2-3>
- Summary -

Big data in healthcare refers to electronic health data sets so large and complex that they are difficult to manage with traditional software and/ or hardware; nor can they be easily managed with traditional or common data management tools and methods. It includes clinical data from CPOE, physician's written notes and prescriptions, medical imaging, laboratory, pharmacy data, machine generated/sensor data etc. The potential for big data analytics in healthcare to lead to better outcomes exists across many scenarios. Potential benefits include detecting diseases at earlier stages when they can be treated more easily and effectively; managing specific individual and population health and detecting health care fraud more quickly and efficiently. The 4 "Vs" of big data analytics in healthcare are volume, velocity, variety and veracity. Over time, health-related data will be created and accumulated continuously, resulting in an incredible volume of data. Data is accumulated in real-time and at a rapid pace, or velocity. The ability to perform real-time analytics against such high-volume data in motion and across all specialties would revolutionize healthcare which is variety. Furthermore, open source platforms such as Hadoop/MapReduce, available on the cloud, have encouraged the application of big data analytics in healthcare.

A practical and hands on methodology is then discussed. In Step 1, the interdisciplinary big data analytics in healthcare team develops a 'concept statement'. In Step 2, questions like What problem is being addressed? Why is it important and interesting to the healthcare provider? etc. are undertaken. Step 3 includes platform/tool evaluation and selection such as AWS Hadoop, Cloudera, or IBM BigInsights etc. In Step 4, the models and their findings are tested and validated. Various real life successful applications of big data analytics in healthcare are then discussed. For example, The Rizzoli Orthopedic Institute in Bologna, Italy, is reportedly using

advanced analytics to gain a more “granular understanding” of the clinical variations within families whereby individual patients display extreme differences in the severity of their symptoms. This insight is reported to have reduced annual hospitalizations by 30% and the number of imaging tests by 60%. Then the paper discusses various challenges of using big data analytics in health care such as the criteria for platform evaluation, big data analytics needs to be packaged so it is menu-driven, user-friendly and transparent. In conclusion, big data analytics has the potential to transform the way healthcare providers use sophisticated technologies to gain insight from their clinical and other data repositories and make informed decisions.