Ref No	Research paper	Authors	Findings
1	Health Big Data Analytics: A Technology Survey	Gaspard Harerimana, Beakcheol Jang, Jong Wook Kim	Because of the vast availability of data, there has been an additional focus on the health industry and an increasing number of studies that aim to leverage the data to improve healthcare have been conducted. Health data are growing increasingly large, and more complex, and its sources have increased tremendously to include computerized physician order entry, electronic medical records, clinical notes, medical images, cyber-physical systems, medical Internet of Things, genomic data, and clinical decision support systems. New types of data from sources like social network services and genomic data are used to build personalized healthcare systems, hence health data are obtained in various forms, from varied sources, contexts, and technologies, and their nature can impede a proper analysis. Any analytical research must overcome these obstacles to mine data and produce meaningful insights to save lives. In this paper, investigate the key challenges, data sources, techniques, technologies, as well as future directions in the field of big data analytics in healthcare. provided a do-it-yourself review that delivers a holistic, simplified and easily understandable view of various technologies that are used to develop an integrated health analytic application.
2	Saving Lives and Money with Smarter Hospitals	Leslie Mertz	One of the medical institutions that got an early start on smart hospital technology is the Veterans Administration (VA), according to Keith Salzman, M.D. (Figure 1), who has experience with both the U.S. Department of Defense (DoD) and the VA, and is now the chief medical information officer for IBM's U.S. Federal Healthcare Practice, which addresses the technology needs of American public-sector health institutions. "In 2004, I started working with informatics at Madigan Army Medical Center in Tacoma, Washington. We had received a National Defense Authorization Act grant to demonstrate interoperability between the DoD and VA health care in terms of sharing both data and documents," he says. It was a big undertaking because DoD and VA health care delivery systems have patient populations that are equivalent to the size of Kaiser Permanente—one of the biggest health care delivery organizations in the country.
3	Emerging Technologies for Next Generation Remote Health Care and Assisted Living	IJAZ AHMAD, ZEESHAN ASGHAR, TANESH KUMAR,GAOLEI LI, AHSAN MANZOOR, KONSTANTIN MIKHAYLOV, SYED ATTIQUE SHAH, MARKO HÖYHTYÄ ,JARMO REPONEN,JYRKI HUUSKO, AND ERKKI HARJULA	According to the International Labour Organization (ILO), the aging of population is one of the main problems of this century, since it increases the proportion of old people within the total population. Along with aging population, according to World Health Organization (WHO), the worldwide prevalence of chronic diseases increases fast and new threats, such as Covid-19 pandemic, continue to emerge. Together, these challenges will cause enormous pressure on the efficacy and cost-efficiency of healthcare systems worldwide. The introduction of novel intelligent remote healthcare services is a prominent solution to ensure a high level of treatment outcome, cost-efficiency and sustainability of the healthcare The associate editor coordinating the review of this manuscript and approving it for publication was Lorenzo Mucchi . system in this situation.
4	Large Scale Infrastructure for Health Data Analytics	Samantha Crossfield, Owen Johnson, Thomas Fleming	The opportunities for data analytics to inform the science and practice of health care are growing. For example, in the UK, 65 million citizens have lifelong e-health records that can be used to examine patterns of disease, treatment, and outcomes. Similarly, the real-world impact of interventions such as new drugs can be evaluated in these

			records. Such approaches need to solve issues around information governance, confidentiality, understanding data and provenance, and developing methods for big data. Here this describes a large-scale service that addresses the opportunities brought by the availability of large-scale e-health records. The service has been used to support 50 research projects in the UK across a wide range of scientific areas and can be seen as an exemplar for the developing field of health data analytics.
5	A Systematic Review on Healthcare Analytics: Application and Theoretical Perspective of Data Mining	S.Siva Parvathy M.Bhuvaneswri	The growing healthcare industry is generating a large volume of useful data on patient demographics, treatment plans, payment, and insurance coverage—attracting the attention of clinicians and scientists alike. In recent years, a number of peer-reviewed article real-time dressed different dimensions of data mining applications in healthcare. However, the lack of a comprehensive and systematic narrative motivated us to construct a literature review on this topic. In this paper, Presented a review of the literature on healthcare analytics using data mining and big data. Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, and conducted a database search between 2005 and 2016. Critical elements of the selected studies—healthcare sub-areas, data mining techniques, types of analytics, data, and data sources—were extracted to provide a systematic view of development in this field and possible future directions. Found that the existing literature mostly examines analytics in clinical and administrative decision-making. The use of human-generated data is predominant considering the wide adoption of Electronic Medical records in clinical care. However, analytics based on website and social media data has been increasing in recent years. The lack of prescriptive analytics in practice and the integration of domain expert knowledge in the decision-making process emphasizes the necessity of future research.
6	VACCINATED - Visual Analytics for Characterizing a Pandemic Spread VAST 2010 Mini Challenge 2 Award: Support for Future Detection	Abish Malik,Shehzad Afzal,Erin Hodgess† David S. Ebert,Ross Maciejewsk	Once the data was classified, we utilized and extended work done by the Purdue University Visual Analytics Center on healthcare analysis . Our system consists of a combination of linked views, showing time series views of syndromes and death rates through line graph views , stacked graph views showing deaths, geographical map views showing the impact by country (not illustrated in this paper), and summary windows providing statistical breakdowns of the data (not illustrated in this paper). All views are linked through an interactive time slider that allows users to explore the data over time. Extensions to our previous work include the stacked graph view, summary windows, new control chart methods, and an interactive ‘tape measure’ tool
7	METEOR: An Enterprise Health Informatics Environment to Support Evidence-Based Medicine	Mamta Puppala, Tiancheng He, Shenyi Chen, Richard Ogunti, Xiaohui Yu, Fuhai Li, Robert Jackson, and Stephen T. C. Wong	. It is recognized that the current process is cumbersome, costly, and time consuming and adds no intrinsic value to the research being undertaken. This leads investigators to spend a lot of unproductive time in negotiating and waiting for data instead of conducting the research. Worse, the data ultimately delivered often are incomplete, depending on the understanding and knowledge of the person retrieving the data. In many institutions, a “gray market” for data could develop, as researchers find unofficial workarounds to obtain data they need for their work. This “gray market” approach could lead to compliance and security risks, as isolated silos of patient data evolve in different parts of the healthcare organization without formal oversight for Health Insurance Portability and Accountability Act (HIPAA) and Institutional Review Board (IRB) compliance, and outside of the processes for protecting data from misuse or breach. HMH researchers

			need access to vast pools of patient data to develop and test their scientific hypotheses, so the making of a solitary integrated data system would provide a huge opportunity for an expanded number of biomedical research projects, including large-scale projects.
8	Data-Enabled Digestive Medicine: A New Big Data Analytics Platform	Lu Yan, Weihong Huang , Liming Wang , Song Feng, Yonghong Peng , and Jie Peng	Furthermore, this platform has been gradually opened to other clinical departments to support different clinical research work in different diseases. We are trying to build up the health care big data platform which is suitable for diseases of all systems within our whole hospital. And at present, mutlti-center clinical research is of great significance for realizing multi-center and multi-discipline extensive collaborative research on the same clinical problem. Our plan is to build this big data platform into a multi-center clinical big data application platform, which will cover the most of the large and medium-sized hospitals in the whole Hunan province.
9	Optimizing the Electronic Health Records Through Big Data Analytics: A Knowledge-Based View	CAIFENG ZHANG1 , RUI MA , SHIWEI SUN, YUJIE LI , YICHUAN WANG , AND ZHIJUN YAN	Many hospitals are suffering from ineffective use of big data analytics with electronic health records (EHRs) to generate high quality insights for their clinical practices. Organizational learning has been a key role in improving the use of big data analytics with EHRs. Drawing on the knowledge-based view and big data lifecycle, we investigate how the three modes of knowledge can achieve meaningful use of big data analytics with EHRs. To test the associations in the proposed research model, we surveyed 580 nurses of a large hospital in China in 2019. Structural equation modelling was used to examine relationships between knowledge mode of EHRs and meaningful use of EHRs. The results reveal that know-what about EHRs utilization, know-how EHRs storage and utilization, and know-why storage and utilization can improve nurses' meaningful use of big data analytics with EHRs. This study contributes to the existing digital health and big data literature by exploring the proper adaptation of analytical tools to EHRs from the different knowledge mode in order to shape meaningful use of big data analytics with EHRs.
10	Overcoming the Barriers That Obscure the Interlinking and Analysis of Clinical Data Through Harmonization and Incremental Learning	Vasileios C. Pezoulas , Student Member, IEEE, Konstantina D. Kourou , Fanis Kalatzis, Themis P. Exarchos, Member, IEEE, Evi Zampeli, Saviana Gandolfo, Andreas Goules, Chiara Baldini, Fotini Skopouli, Salvatore De Vita, Athanasios G. Tzioufas, and Dimitrios I. Fotiadis	In this work, we present a complete framework for medical data sharing, curation, harmonization and federated data analytics. The legal and ethical compliance of the data sharing process is ensured through a data sharing assessment mechanism. A medical data curation workflow is applied on the clinical data to deal with outliers, inconsistent fields and missing values. The curated data are then harmonized using lexical and semantic matching methods based on a disease-oriented ontology. The harmonized data are finally stored in private cloud spaces and co-analyzed using incremental learning algorithms to address a clinical unmet need related to lymphoma prediction in primary Sjögren's Syndrome (pSS) using clinical data from four European cohorts. The outcomes of the case study yield highly qualified and harmonized data with more than 85% agreement along with robust lymphoma prediction models with more than 80% accuracy, sensitivity and specificity