

## 3 Areas of Focus for Big Data in Healthcare

At the heart of most emerging healthcare technologies is data. We now live in a world in which little can be done without either collecting or analyzing data, particularly in the medical field. We consistently reap the benefits when big data techniques are properly applied in healthcare arenas.



Blue Cross Blue Shield (BCBS) recently demonstrated this benefit when they reported a causal link between serious dental and vision complaints and other serious conditions (1). In their Health of America Report, they used the BCBS Health Index (2), a measurement of health which incorporates over 200 health conditions and their influences on the health of the insured, to determine that:

“People with serious dental conditions are 25 percent more likely to suffer from heart disease and more likely to have autoimmune disorders, anemia, gastro-intestinal disorders and renal disease. They are twice as likely to visit the emergency room compared to those who do not have a medical claim for severe dental conditions.”

Similar claims were made for people with serious eye conditions. By utilizing the big data that they are collecting on each individual, BCBS was able to discover crucial trends that can increase level of care and awareness for present conditions as well as preventative measures.

The healthcare field is brimming with similar opportunities to apply big data, but where should we be focusing future efforts? Here are three healthcare concentrations which will benefit from big data today:

### **1. Diagnostic Technologies**

Artificial intelligence (A.I.) developments such as IBM’s Watson for Oncology demonstrate the advantages of incorporating big data into diagnostics [3]. Watson leverages massive medical databases as well as the patient’s individual medical history and genetic information in order to identify treatment options. Watson has been used for actual diagnoses at multiple clinical centers. As Watson continues to be refined, we are finding that the future for diagnostic technologies lies in the merging of big data and deep learning with other scientific fields such as biochemistry and genetics. Additionally, this technology can expand access to healthcare in regions that have few physicians or are remotely located and difficult to reach.

Diagnostic technology development can also advance through increased patient participation in the decision-making process [4]. An important part of this process is to increase a patient's understanding concerning their health conditions and risks. Of course, patients and clinicians alike must be cautioned against relying on just any source from the internet. Clinical diagnosis support systems, which combine big data with A.I, can provide patients and clinicians with access to proven diagnosis search algorithms [5]. With the advance of smart medical devices and software, patients will be able to take an active role in monitoring their health.

## **2. Resource Allocation**

Resource allocation can benefit from big data developments on many planes. At the localized level, hospital resources can be managed in a more efficient manner if data regarding facility function is obtained and analyzed. Results can be used to define usual conditions, recognize system degradation as a function of increased load, such as higher patient population or increased severity of a disease, and inform how to most efficiently reorganize the system [6]. Similar techniques can be applied on a national level to manage resources based on recognized trends, such as using patterns of a seasonal/ geographical outbreak of the flu to motivate an increased concentration of vaccination supply to specific areas during certain times of the year. Big data can help us identify trends and get a better sense of the supplies that are needed, leading to less waste and more efficient response for demand.

Globally, big data can help track epidemics, ensuring that supplies are being produced in adequate supply and moved to regions of need. Analysis of past events also contributes to preparing for future outbreaks. As world travel continues become more accessible and the global population is increasingly intertwined, mitigating conditions that could lead to a pandemic is crucial.

A major challenge in resource allocation is the associated ethics in applying decisions and assessing risk [7]. It is not always about the most efficient or least-costly decision; it often comes down to the ethically appropriate decision for the many parties being considered. The aim of big data would not be to replace decision makers, but rather to give them a thorough overview of the situation so that they can account for as many variables as possible when making these impactful choices. Big data can provide a lot of value if judiciously employed to bring accurate information to decision makers.

## **3. Healthcare Delivery Decisions**

We have seen where big data can be used to increase the accuracy of diagnoses and to improve the efficiency of resource allocation. Healthcare delivery is where these two areas meet. Here, the goal is to diagnose and provide treatment for conditions as accurately and efficiently as possible. The field has traditionally relied on the individual decisions made by doctors, nurses, therapists, etc. Unfortunately, medical professionals are human beings capable of making mistakes, leading to flawed healthcare delivery systems, and resulting in rising costs and inefficiencies [8]. A report from the Organization for Economic Co-operation and Development (OECD) in 2017 found that in member countries (including the US), for every dollar spent on healthcare, about \$0.20 was wasted in some way [9]. If even a portion of that waste could be used for its intended purpose, patient care could improve dramatically without any changes in cost.

Improvement in healthcare delivery is possible if we can continue improve our methods and use of big data. This is why tech giants such as Google, Amazon, IBM, Microsoft, Oracle and Salesforce are joining together to ensure that big data has a seat at the table of healthcare without sacrificing quality or efficiency. Their joint statement reads: "We are jointly committed to removing barriers for the adoption of technologies for healthcare interoperability, particularly those that are enabled through the cloud and AI" [10]. It is exciting to think about the possibilities of healthcare, as the integration of big data and A.I. continues to drive healthcare delivery toward an optimal system.

Read more on Rock West's capabilities in research and development [for the healthcare industry here](#).

Sources:

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