Big Data in Health care

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Abstract

The health care system is fastly adopting electronic health record, which greatly increase the quantity of clinical data which are available electronically. Simultaneously, fastly progress also made in clinical analytics-technique for analyzing big amount of data and select new insights form that analysis which is part of what is known as big data.Big data has changed the way we manage analyze data in any industry One of the most useful area where big data can be useful to make change which is health care.Health care analytics has the potential to reduce the cost of treatment , judge outbreaks of epidemics, avoid preventable diseases improve the way of living.The lifecycle of the human beings increasing together with the world population which acts new challenges to today's treatment delivery methods.Health care professional just like business executives, which are capable of collecting big amount of data and look for best strategies to use these numbers.

INTRODUCTION

A collection of large and complex data sets which are difficult to process using the common database management tools traditional data processing technique. Big data refer to the tools, process and procedure allowing an origination to create, manipulate and manage very large data set and storage facility. The concept of big data is not new however the way of defining the big data is constantly changing .We can also define "Big data" it is collection of data elements whose size ,speed ,types and complexity require one to seek ,adopt and invent new hardware and software mechanism in order to successfully store ,analyze and visualize the data [1-3].

Health care is the best example of how the three V's of data ,velocity ,verity and volume . This data is spread among multiple health care system ,health insurance ,research ,government entities and so on.

EXAMPLES OF HOW HEALTHCARE CAN USE BIG DATA:

1. Evidence-Based Medicine

The practice of applying the same tests to all patients who come into the emergency department with similar symptoms is known as cookbook medicine. This technique is efficient, but not very effective. As a patient cured for a heart attack while he has gallstone pain doesn't help anyone.

Curing the patient based on data from different competing institutions is known as Evidence based medicine. This approach helps the care givers to treat patient effectively and efficiently.

For example, organizations may use Smartphone app that uses a Web-based- drag-and-drop UI to give caregivers self-service access to 200 million data points about 2 million patients.

But the process of health information exchange, necessary for getting that patient data is not easy. Even when data's in hand, analysis can be complicated. For example, one electronic health record (EHR) system calls "high blood pressure" a second may call "elevated blood pressure" and a third "hypertension." To avoid this situation, there should be a way to standardize data. Data should be more searchable, which aids the research query process.

2. Participation of Everyone

The practice of medicine cannot succeed without research, but the research process itself is flawed, says Leonard D'Avolio, associate center director of biomedical informatics for MAVERIC within the U.S. Department of Veterans Affairs. Randomized controlled trials can last many years and cost millions of dollars, he says, while observational studies can suffer from inherent bias.

The VA's remedy has been the Million Veteran Program, a voluntary research program that's using blood samples and other health information from U.S. military veterans to study how genes affect one's health. So far, more than 150,000 veterans have enrolled, D'Avolio says.

All data is available to the VA's 3,300 researchers and its hospital academic affiliates. The idea, he says, is to embed the clinical trial within VistA, the VA EHR system, with the data then used to augment clinical decision support.

3. Make EHR 'Smart'

A data warehouse is great, says John D'Amore, founder of clinical analytics software vendor Clinfometrics.

Sometimes it is better to use lightweight applications—which are easy to build in order to accomplish a specific task instead of using big and expensive one.

To accomplish this, there should be a standard. For example, all records must adhere to the **Continuity of Care Document (CCD) standard.** A **certified EHR** must be able to generate a CCD file, and this is often done in the form of a patient care summary. In addition, terminologies used in these files should also be in standard form.

But there is limitation of these apps. The inability or EHR, health and wellness apps to communicate among themselves is a "significant limitation," Sittig says. The government incentive program that encourages EHR use only makes the testing of care summary exchange optional, and at the moment fewer than 25 percent of hospitals are doing so.

4. 'Domesticate' Data for Better result

Domestication of data requires organizations to submit syndromic surveillance data, immunization registries and other information to public health agencies. This offers a great opportunity to "normalize" raw patient data, as well as by performing real-time natural language processing and using tools to determine which conditions are worth reporting.

Now, Healthcare organizations need not to hunt for and gather data; the challenge is to domesticate the data for an informaticist's provision and control.

The benefits of this process, in addition to meeting regulatory requirements, also include research that takes demographic information as well as corollary tests related to specific treatments. This eliminates gaps in records that public health agencies often must fill with phone calls to already burdened healthcare organizations. In return, the community data that physicians receive from public health agencies will be robust enough to support population health decision.

5. Articulate SOA Strategy

Dr. Mark Dente, managing director and chief medical officer for MBS Services, recommends that healthcare organizations "aggregate clinical data at whatever level you can afford to do it," then normalize that data.

For this, modules and apps are created as described above. This often requires linking contemporary data sets to legacy IT architecture. The MUMPS programming language, originally designed in 1966, has served healthcare's data processing needs well, but data extraction is difficult.

Solution to this problem is Service oriented architecture (SOA). it can be used to built host today's and tomorrow's data sets, from sources that organizations don't even know. (This could range from personal medical devices to a patient's grocery store rewards card.)

6. Informed Strategic Planning

Strategic plans for healthcare organizations often resort to reactive responses to the competitive market and a "built it and they will come" mentality, says Les Jebson, director of the Diabetes Center of Excellence within the University of Florida Academic Health System. It is a more proactive approach.

Advantage of big data in medical application and heath care:

Effective large scale analysis require the collection of different data from the various type of sources .Implementing advance analytics to the patient profiles ,characteristics' ,cost and result of care can help in recognizing the clinically and less cost treatment . Big data could help in decrease the waste and inefficiency in the below three area [manyika et al 2011].

1. Clinical Operations:-Resolve large clinically relevant and less cost effective ways to diagnose and treat patients.
2. Research and development:- Improve clinic….. design.so that we decrease trial failure and scattered new treatment in the market .
3. Public health:- Discover diseases pattern