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Introduction

Business intelligence (BI) is a way for companies to use data to make better decisions. In healthcare, BI has become very important. This is because healthcare produces a lot of data such as patient records, medical histories and treatment plans. Using BI, healthcare companies can look through this data to find helpful information that improves patient care and hospital processes.

This report looks at the main trends in how healthcare is using BI today. It will explain how BI helps healthcare companies work more efficiently and make better choices for their patients. New tools, like data analytics and AI, allow hospitals to predict patient needs and improve treatment plans.

The goal of this report is to show how healthcare organisations benefit from BI, how it is changing the way they work and what the future may hold for these tools in the healthcare sector.

Discussion

In healthcare using data has become essential for making decisions that improve patient care and hospital operations. With the high growth of data, healthcare providers rely more and more on Business Intelligence (BI) to gather, process and understand this information. BI helps in turning data into clear and useful insights that hospitals and clinics can use. This will explore the trends in BI in the healthcare sector, the types of data used, the tools involved and the future of BI in healthcare. (Coursera. (2024))

Trends in Business Intelligence in Healthcare

One big trend in healthcare BI is the use of predictive analytics. Predictive analytics allows healthcare providers to look at past data and make educated guesses about future outcomes. (www.this.nhs.uk. (n.d.)). For example, hospitals can predict patient demand based on patterns in previous admissions. During flu season they can look at data from past years to prepare for higher or lower numbers of patients. Predictive analytics also helps with identifying patients who might be at risk for certain diseases. By looking at health records and patient histories, BI tools can flag patients who may need extra care or early treatment which can prevent serious illness later.

Another key trend is real-time data analysis. Real-time analysis means that data is updated and available as events happen. For example, doctors and nurses can track patient vital signs in real-time, such as heart rate or blood pressure, through BI dashboards. If something unusual happens, such as a sudden drop in blood pressure, the system can send an alert immediately. This lets medical staff act quickly, which can save lives. Real-time data is also useful for hospital management, as it can show things like how many beds are available, where staff are most needed or if there are any equipment shortages.

Data integration is another important trend. Data in healthcare often comes from many sources, like electronic health records (EHRs), lab results, pharmacy records and wearable devices that monitor health. Data integration means combining all this data into one place where it can be easily accessed and analysed. This makes it easier for healthcare providers to see the full picture of a patient's health. Instead of looking at separate reports from the lab, the pharmacy and the patient's doctor, BI tools can bring all this information together into one place. This gives doctors and nurses a better understanding of what is going on with each patient. (Anwar, M. (2023).)

Types of Big Data in Healthcare

Big data in healthcare comes in many forms. There is structured data, which includes data that is organised and easy to search. Examples of structured data are patient names, dates of birth and medical codes for diagnoses and treatments. This kind of data is often stored in databases, which makes it easy to analyse.

Another type is unstructured data, which is not as easy to organise. Examples of unstructured data include doctor's notes, medical images (like X-rays) and emails. Unstructured data can be harder to analyse because it does not fit neatly into rows and columns like structured data does. However, new BI tools are becoming better at analysing this kind of data. Tools can now scan through doctor's notes to identify mentions of symptoms or treatments, which helps in getting valuable information that might otherwise be overlooked. (Kong, H.-J. (2019).)

There is also semi-structured data, which falls between structured and unstructured data. Semi-structured data includes things like emails with a specific format or sensor data from wearable devices. In healthcare, wearable devices are becoming common for tracking patient health metrics, like heart rate or blood sugar levels. This data can then be analysed by BI tools to provide insights on the patient's health trends.

Tools and Platforms for Handling Big Data

Several tools and platforms help healthcare organisations manage and analyse big data. One commonly used tool is data warehouses, which store large amounts of data from different sources. Data warehouses are designed to handle both structured and unstructured data. They provide a single, centralised space for storing data which makes it easier to analyse and share information across different departments in a hospital.

Dashboards are another valuable tool in BI. Dashboards display data in a visual format, like graphs and charts which makes it easy to understand the data. A hospital may use a dashboard to monitor patient flow, showing the number of patients in each department, waiting times and bed availability. This helps managers make quick decisions based on the current situation.

Machine learning is also becoming a popular tool in healthcare BI. Machine learning involves using algorithms to find patterns in data and make predictions. Machine learning can help hospitals predict which patients are likely to return to the hospital after being discharged. By looking at past patient data, machine learning algorithms can find risk factors allowing healthcare providers to take steps to prevent them. (Habehh, H. and Gohel, S. (2021).)

Another important tool is cloud computing. Cloud platforms allow healthcare providers to store data online, which can be accessed from anywhere with an internet connection. This is especially useful in healthcare because it enables easy data sharing between hospitals, clinics, and even patients themselves. Cloud computing also provides a high level of security for sensitive patient information, as cloud providers follow strict security standards.

Benefits of Business Intelligence in Healthcare

BI offers many benefits to the healthcare sector. One major benefit is improved patient care. By analysing data from patient records, treatment histories and even lifestyle information, healthcare providers can make more personalised treatment plans. If data shows that a patient has a higher risk for diabetes, doctors can suggest lifestyle changes or preventive treatments. This can help in managing or preventing health issues before they become serious.

Another benefit is cost savings. BI helps hospitals identify areas where they can save money without compromising patient care. Data analysis may show that a certain type of equipment is rarely used, suggesting that it may be more cost-effective to lease it rather than buy it. Also, by predicting patient demands, hospitals can avoid overstaffing or understaffing which helps in managing labor costs.

BI also helps in improving hospital operations. Through data analysis, hospitals can identify inefficiencies in their processes. For example, if data shows that there are frequent delays in patient discharge, the hospital can look into what is causing the delays and find ways to speed up the process. This can lead to a better experience for patients and more efficient use of hospital resources. (Gupta, D. (2023))

Future Prospects of Business Intelligence in Healthcare

The role of BI in healthcare is expected to grow. One exciting future prospect is the use of artificial intelligence (AI) in BI. AI can process huge amounts of data quickly and identify patterns that may not be obvious to humans. AI could help in diagnosing diseases by analysing data from medical images or lab results. This could lead to faster and more accurate diagnoses.

Another future trend is the increased use of wearable devices. Devices like fitness trackers and smartwatches, can collect health data in real-time. This data can be sent directly to healthcare providers, giving them an up-to-date view of a patient's health. In the future, more people may use

wearables to track health metrics, allowing healthcare providers to catch potential health issues early on.

Finally, there is a strong possibility that personalised medicine will become more common with the help of BI. Personalised medicine means creating treatments that are tailored to each individual patient, based on their unique data. Genetic data, for example, can help doctors decide which medications are likely to work best for a particular patient. As BI tools become better at handling genetic data, personalised medicine could become a standard part of healthcare. (NHS England (2019))

Conclusion

Business Intelligence is transforming healthcare by helping providers make better decisions through data. Predictive analytics, real-time data and data integration are shaping the healthcare sector. By using these tools, healthcare organisations can improve patient care, reduce costs and run more efficiently.

One key impact of BI is its ability to help predict patient needs and personalise treatments, leading to better health outcomes. Real-time data and dashboards also help doctors and hospital staff respond quickly to changes in patient health. Machine learning and cloud computing further support data analysis and storage, making it easier to share important health information securely.

Looking to the future, the role of BI in healthcare is expected to expand with advancements in artificial intelligence, wearable devices and personalised medicine. These innovations will allow healthcare providers to offer more precise and proactive care. Overall, BI is helping healthcare move towards a data-driven future where decisions are more informed, patient care is more effective and operations are more efficient.

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