

**PREDICTIVE ANALYTICS FOR THE HEALTHCARE INDUSTRY**

**By**

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Today, healthcare companies are drowning in data. According to IBM, most healthcare organizations have terabytes and terabytes of data in their systems, but are challenged to gain reliable, actionable insights from this data. In fact, more than 80% of an healthcare organization's data today is unstructured; physician's notes, registration forms, discharge summaries, and patient documents all combine to produce a mishmash of unstructured information chaos. And it is only going to get worse – this type of data is doubling every five years. As a result, millions of patient notes and records often sit unavailable in separate clinical data silos. This content contains highly valuable information, but historically there's been no easy way to analyze it. Predictive analytics is changing all of this, but with it comes the question, “Are we putting data to work for us or are we merely responding to the data?”

The term 'Data rich, but information poor' is a fitting description for the healthcare industry. Only in the last few years have computers been used for more than patient billing and scheduling. As technological advances have made data more accessible, more reliable and easier to use, integrative concepts like translation medicine are bridging the worlds of primary research, clinical research and bedside care. Predictive analytics is helping make these connections in the following ways:

- **Disease management** – this can be used to drive a predictive risk of cost for each member in a healthcare plan by asking such questions as, “How probable is it that this person will be high risk, high cost?”
- **Enhancing patient care** – healthcare facilities can take a more proactive approach to treatment. For example, by more precisely predicting which patients will develop chronic conditions, or which ones will respond best to certain types of medications or therapies, healthcare organizations can focus not only on treating existing conditions, but also on preventing recurrences.
- **Optimizing resource utilization** – patterns and trends in patient admissions, bed utilization, length of stay, and other metrics can be analyzed and used to predict future volumes – particularly when peaks may occur. Hospitals can be more prepared and ensure there are enough resources on hand to provide superior care, thereby better allocating nurses, clinicians, diagnostic machinery, and other resources.
- **Fraud detection** – predictive analytics can help healthcare professionals determine claims that need additional review for fraud by increasing the likelihood of discovering fraudulent claims.
- **Improving clinical outcomes** – health care organizations can pull clinical data from large amounts of patient information to understand patient histories and predict future outcomes. By closely analyzing which treatments work best, providers can make more intelligent decisions about treatment plans, minimizing complications and patient readmissions.
- **Increasing income and revenue** – identify opportunities to collect missing income, including claims that are wrongfully rejected by payers or overdue monies from patients.

The concept of evidence-based medicine is based on the simple suggestion that if we see patterns in our data, we ought to pay attention to it. Predictive analytics – a variety of statistical techniques that analyze current and historical facts to make predictions about future events – helps uncover these patterns so that clinicians rather than IT professionals can make sense of them. Using techniques such as predictive modeling, machine learning, data mining and game theory, predictive analytics can build models that exploit patterns found in historical and transactional data to identify patient risks and, just as importantly, medical opportunities. The various predictive analytical models can also predict outcomes of complex decisions, relationships, products and/or processes. Specifically, predictive analytics can help in three key areas; Operations management, Medical management and biomedicine, and System design and planning.



**Operations management**

- Reduce variability in the delivery processes
- Improve efficiency and effectiveness in the delivery of clinical, ancillary, and administrative services through process analyses



**Medical management & biomedicine**

- Assist in the structuring and support of medical decisions
- Improve the performance of diagnosis, testing, and treatment strategies

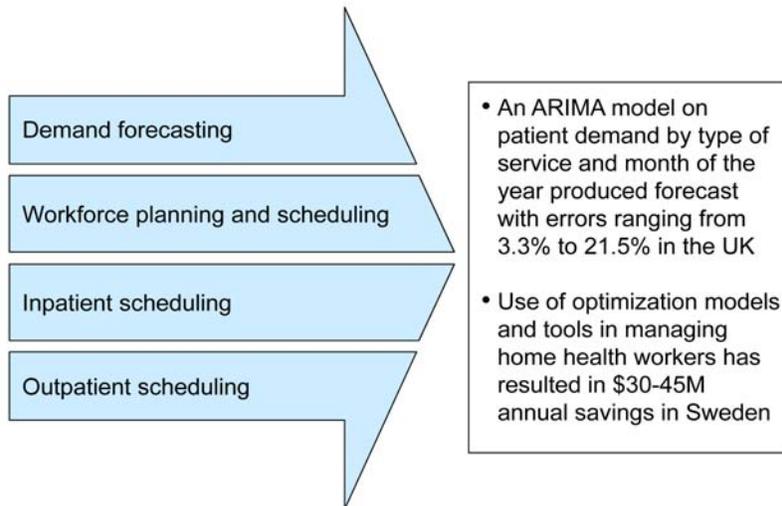


**System design and planning**

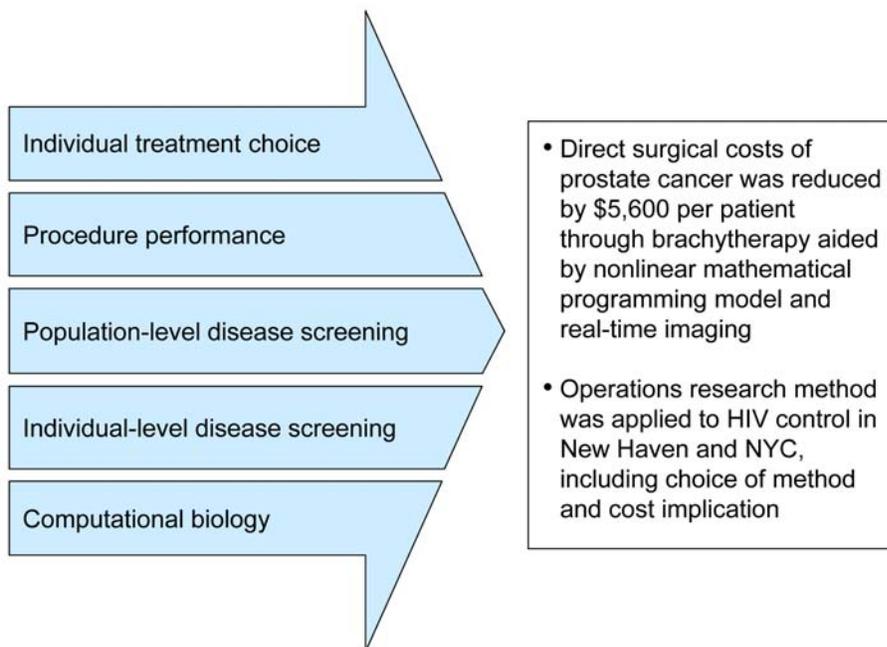
- Facilitate decision-making on services and technology to be provided
- Assist in planning for level of resources and capacity

For the healthcare industry, predictive analytics can help healthcare professionals go beyond traditional search and analysis of unstructured data by applying predictive root cause analysis, natural language and built-in medical terminology support to identify trends and patterns to achieve clinical and operational insights. Predictive analytics can deconstruct a hospital's massive data warehouse, making the information held within that data warehouse more meaningful. It can extrapolate trends, invent and validate a hypothesis, as well as predict future activity.

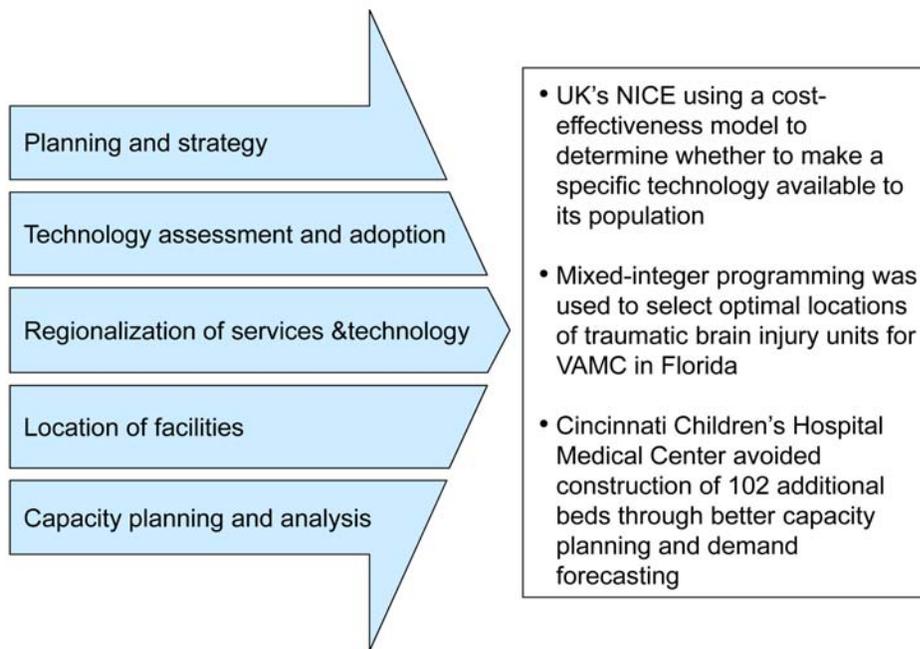
Operations management can result in direct cost saving through better planning, as per the following figure:



Operations research methods can improve clinical practice as well as basic research, as per the following figure:



Decision on infrastructure investment and service provision can be facilitated through operations method, as per the following figure:



One of the issues a healthcare predictive analytics system can help address is the cost of patients being repeatedly admitted and readmitted to a hospital for similar or multiple chronic diseases. According to the *New England Journal of Medicine*, one in five patients suffer from preventable readmissions. In a recent report, it was cited that 1% of the population accounts for almost 20% of all US healthcare expenditures; 25% account for over 80% of all expenditures. These figures show that people with chronic conditions – often preventable conditions – account for a disproportionate percentage of expenditure. Half of the US population spends little or nothing on health care, while five percent of the population spends almost half of the total amount. Those in the top five percent spend, on average, more than 17 times as much per person as those in the bottom 50 percent of spenders. Although these are US figures, they can probably be generalized worldwide.

The bottom line is healthcare predictive analytics can help healthcare organizations get to know their patients better, so that they can understand their individual patient's needs, while delivering quality, cost-effective services that could be, literally, life saving. Predictive analytics can help healthcare providers accurately anticipate – and respond to – changes in their patient needs. The ability to make financial, administrative, and clinical decisions based on experience and intuition is enhanced with robust scoring applications that enable precise, validated predictions. Consistent, complete, and accurate results can be used to make better decisions about tomorrow, resulting in higher profits, reduced costs, improved quality of care and maximum ROI.