Data Analytics Opportunities in Health Care

Thoughts on capturing value from data in the healthcare domain

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Data analytics opportunities in health care

In this article:
- Big data and analytics in health care delivers patient and performance benefits
- Your organisation is on a data analytics journey, from data collection to generating value
- Three high impact opportunities to exploit

There is great potential for health care providers to improve operations and patient health outcomes using data.

We are in the midst of a data revolution. Every day, 2.5 trillion gigabytes of data is created globally. Yet many organisations still struggle to gain tangible value from the this flood of data.

Across many sectors, leaders have started taking advantage of data, from retailers tailoring marketing messages to consumers, to insurance companies finding new ways to assess risk based on data sets that were previously unavailable. Many organisations in the health care space are already pursuing Business Intelligence, Analytics, Reporting and Data-Management initiatives.

Possible benefits include better patient health outcomes, improved patient engagement and service. Data can also be used to enable medical research and inform public policy (Exhibit 1).

Some organisations are advanced, having built analytical, technical and organisational change capabilities – either by necessity due to competitive forces, or by design out of a desire to renew or even disrupt traditional services.

Yet many health care organisations are still in the early stages of thinking about what the new world of data means for their business.

They need to learn how to approach big data, and determine how best to take advantage of data, how much to invest, what capabilities to build, and in what priority to do things.

Developing a plan for embracing potentially disruptive practices is critical.

Exhibit 1
Potential uses for data analytics in Health

Stages		Example uses for data analytics
Patient Journey	Pre-admission	• **Improve the triage process** – A diagnostic tool utilising patient symptoms and medical history to aid in the diagnosis process and specialist doctor referral.
	Diagnosis	• **Reduce misdiagnosis -** A consolidated record of all patient treatment within a hospital and across multiple providers to aid future diagnosis and treatment • **Reduce fraud** – Identification of usage outliers to highlight potential prescription fraud
	Managing Treatment	• **Treatment optimisation -** A data analytics device that collects a range of ICU data to identify the best patient treatment, including optimising time spent in ICU
	Post-Treatment	• **Improve patient outcomes -** Performance analytics incorporating recovery rate, time in hospital, etc. to evaluate the effectiveness of a given treatment
Enablers	Patient Record Management	• **Efficiency in Patient Record Management** –improve basic patient record management through the application of current-day new-data warehouse techniques, integrating "virtual" records from several data sources without the need for major database work.
	Enabling Research	• **Big data fusion -** Enables storage of large data sets by only storing important extracts • **Enhance research effectiveness -** Data lake sharing platform between hospital(s) and medical communities to enable broader clinical research into treatment effectiveness
	Enabling Public Policy	• **Support public policy intervention** – Identify high-risk individuals or populations and offer intervention / support when needed
	Enabling Hospital Performance	• **More effective investment allocation -** Understand future population medical needs to inform infrastructure investments • **More effective resource allocation** – Cost analytics tool that uses hospital data to measure economic performance and enable more efficient use of resources

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Healthcare organisations need to first start by considering their data analytics maturity.

There are a number of challenges and questions that organisations must consider, including data quality, accessibility, growing analytics capability and enhancing supporting infrastructure.

These challenges range from the basic, such as integrating multiple data sources or implementing cost effective infrastructure, to the more complex. Issues might include the generation of new insights by combining multiple sources of data, and how to capture the full value of these insights - whether that aim is a better patient outcome, or an improvement in organisational performance.

Individual health care providers have different needs, profiles and maturity levels. They may already be underway with data initiatives. Challenges are often specific to particular organisations, and require a tailored approach.

SPP has developed a data analytics maturity matrix to help organisations navigate the data analytics journey (Exhibit 2). SPP sees two main aspects of an organisation's ability to capture benefits from data analytics:

- **The ability to collect and manipulate data.** This refers to technical capability and talent, and includes establishing the infrastructure and processes to manage data, including collection, storage, analytics, security, privacy and retrieval. A key challenge is that data is increasingly captured from multiple structured and unstructured data sources, at different rates, and varies in complexity.

- **The ability to turn insights into value.** This involves organisations being able to clearly identify the issues they are seeking to solve, and effectively allocating the right resources to solve them. It also requires being able to effectively act upon insights to inform strategic decision making.

Regardless of approach, the question of 'where to start' is a key consideration.

Exhibit 2
SPP Data Analytics Maturity Matrix

SPP experience suggests many healthcare institutions are building technology capacity without a strong specific objective in mind.

A greater focus on the ability to turn insights into value is a key area for improvement
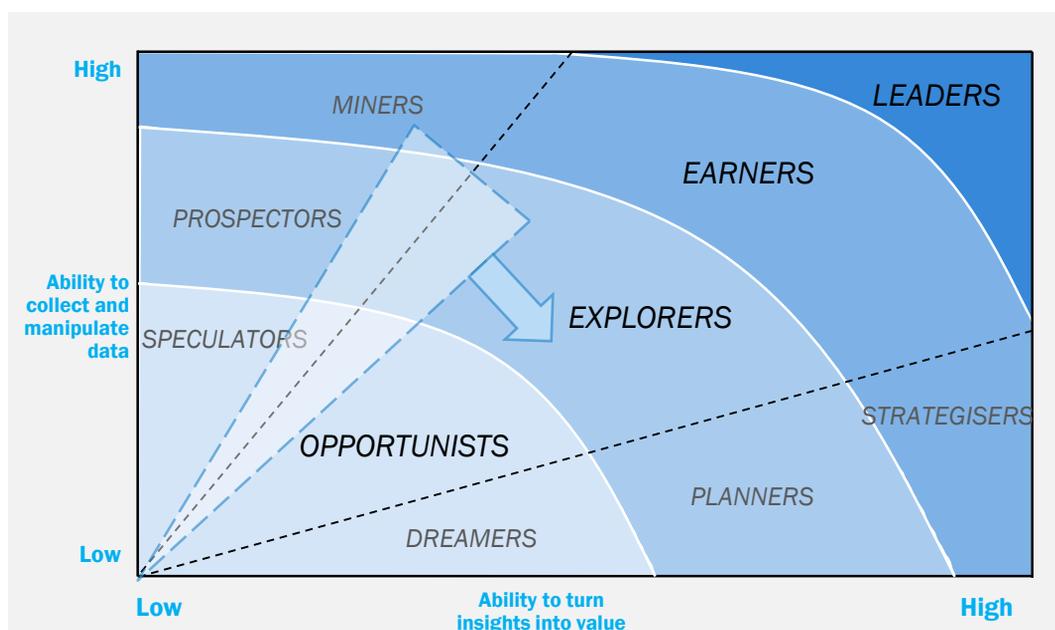
As a starting point, three high-potential opportunities provide some food for thought. For organisations in the early stages of exploring the potential benefits presented by data analytics, the following case studies illustrate three key opportunities which we predict will be heavily exploited in the future.

- Personalised patient treatment plans
- Patient self service
- Operational performance improvement

These cases are not exhaustive, but they represent areas of significant impact if improvements can be made, and where data analytics can deliver major advantages.

Case study 1: Tailored cancer treatment options

EMC's data management framework helped Wake Forest generate advanced analytical insights on data lakes to improve health care outcomes.

Challenges:
- Research needs are varied and the data is often complex
- The research sector has shifted into greater collaborative models, virtual engagement, simulation and data modeling
- Researchers need to interrogate their data to a far greater degree
- Treatment personalisation has proven benefits

Solution:
Data Lake for Precision Medicine

- **Data Strategy** – A strategy was developed in order to connect people, clinical resources, and other data sources to health care researchers and practitioners.
- **Data Transformation and Normalisation** – A master patient index was built to normalise the varied data types and sources to provide a single source of truth and so all parties could 'talk the same language'.
- **Research, Applications and Analytics** – A powerful applications and analytics layer was deployed so that researchers could perform precision, evidence-based medicine.

Benefits:
- Improved health care and greater success of treatments is now possible.
- Wake Forest can now provide cutting-edge cancer treatment options by sequencing the DNA of tumours and cancer cells of patients to develop personalised treatment options that are safer and more effective.
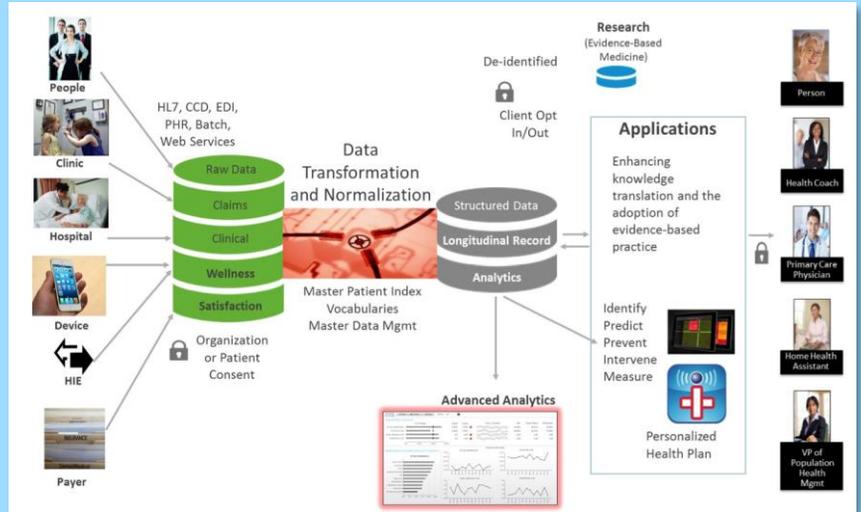
Case study 2: Supporting patient self-management at Denver Health

Denver Health and EMC established the Chronic Condition Management (CCM) platform to provide patient support outside of clinic visits.

Challenges:
- Self-management of long term illness is critical and leads to better outcomes and lower costs
- Denver Health wanted to improve the care of patients with chronic diseases, such as diabetes
- They needed chronically ill patients to manage their diseases on a daily basis alongside their caregivers

Solution:
- EMC & their Partners developed the CCM platform, which offers personalised out-of-clinic support
- Automated messages are sent to the patient, who responds with crucial data such as blood sugar levels
- Patients can communicate via text messaging, email, a web-based portal or interactive voice response

Benefits:
- Improved patient glucose monitoring self-management and improved patient outcomes
- Decreased admissions and reduced medical care costs

Case study 3: Improving operational efficiency through performance analytics

Performance analytics improved Mount Sinai Hospital's operational efficiency by identifying trends over a broad spectrum of available data.

Challenges:
- Mount Sinai Hospital previously approached operational efficiency following an unstructured or narrow approach, rather than a broad, holistic approach
- Data was only used sporadically – for specific purposes and by a limited number of staff

Solution:
- Data analytical tools were deployed that structure available data into a visual dashboard reporting system
- Users can easily drill down and analyse information by any dimension and produce reports and charts

Benefits:
- Reduced average length of stay over time and by service areas outcomes.
- It is now easier to evaluate the effectiveness of a given treatment.
- Physicians' performance has improved.
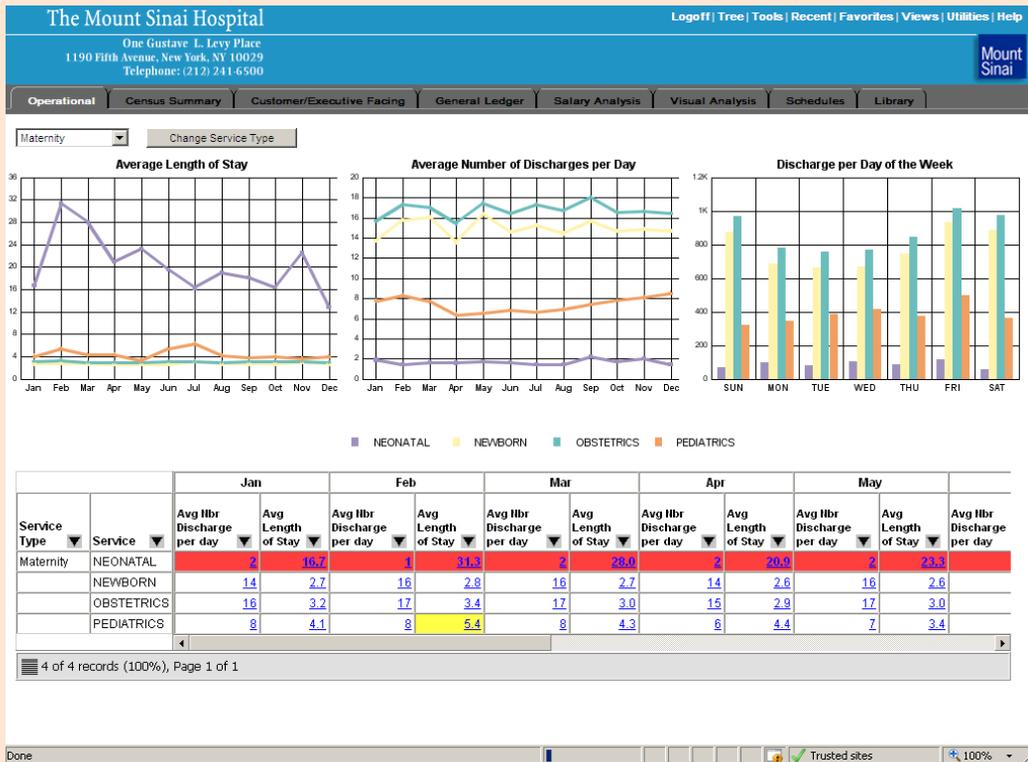
Use of data in health care will continue to evolve - so organisations need to have a plan of attack.

Health care providers increasingly need to take advantage of big data and analytics, or risk being left behind. It is vital for organisations to form a plan for leveraging data and embrace new practices. The types of opportunities and their impacts will vary depending on individual circumstances and existing performance, so developing a clear, tailored strategy is crucial.

Mastering data analytics will ensure that health care organisations will 'be the change' rather than simply 'reacting to change'.

About SPP, EMC & Zetaris

SPP

We are a general management consultant firm focussed on ensuring our clients and partner organisations gain the benefit of a structured, tailored, and evidence-based approach to solving complex business problems.

Established in 2005, SPP has delivered successful outcomes for a broad range of commercial, not-for-profit and government sector clients.

As a result, we have strong relationships with many businesses, from Top 50 listed companies through to small enterprises.

About the authors

Phil Noble
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Phil Noble has a broad range of experience in general management consulting, as well as in Banking and Insurance. Phil has worked on data-related initiatives since 2002 when he was a VP with a data-driven marketing company.

Mads Larsen
Senior Engagement Manager, SPP

Mads Larsen has extensive experience in assisting organisational decision-making and building organisational capability and performance. Mads is a leader in our data analytics practice based in Melbourne.

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Khai Ng recently joined the team at SPP after completing a Masters in Chemical Engineering and BCom at the University of Melbourne.

Anthony Bayer
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Anthony Bayer has deep understanding and experience in developing data and enterprise storage solutions across a number of industries.

Paul Hodges
Senior Account Manager, EMC

Paul has extensive knowledge of the IT challenges being faced by the Victorian Public Health system and has worked closely with a number of prominent Victorian health organisations over the past 3 years.

Our work in data

SPP has a specialist practice in the development of data analytics capabilities for our Clients. These activities span a number of engagement types including:

- Developing data strategy;
- Program management of capability build;
- Data-driven retention strategy;
- Data-driven costing and pricing reviews;
- Business intelligence system reviews and implementation

SPP, Zetaris and EMC offer a complete solution for database, analytics, BI, and data visualisation in healthcare and in other sectors.

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SPP

‣ *Insight*
‣ *Influence*
‣ *Impact*

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Vinay is the Founder and CEO of Zetaris, a leading Analytics and New Data Warehouse firm, with over 25 years experience in the sector